a W. R. C. Smith publication

FIFTY CENTS

Textile Industries

Formerly "COTTON"

OCTOBER, 1959

WASH-AND-WEAR
32 pages of exclusive features on latest developments in drip-dry cottons, synthetics and knit goods
Starts on page 113

A textured yarn success story
page 146

Wage incentives a problem?
page 149

Do you check gear run-out too?
page 154

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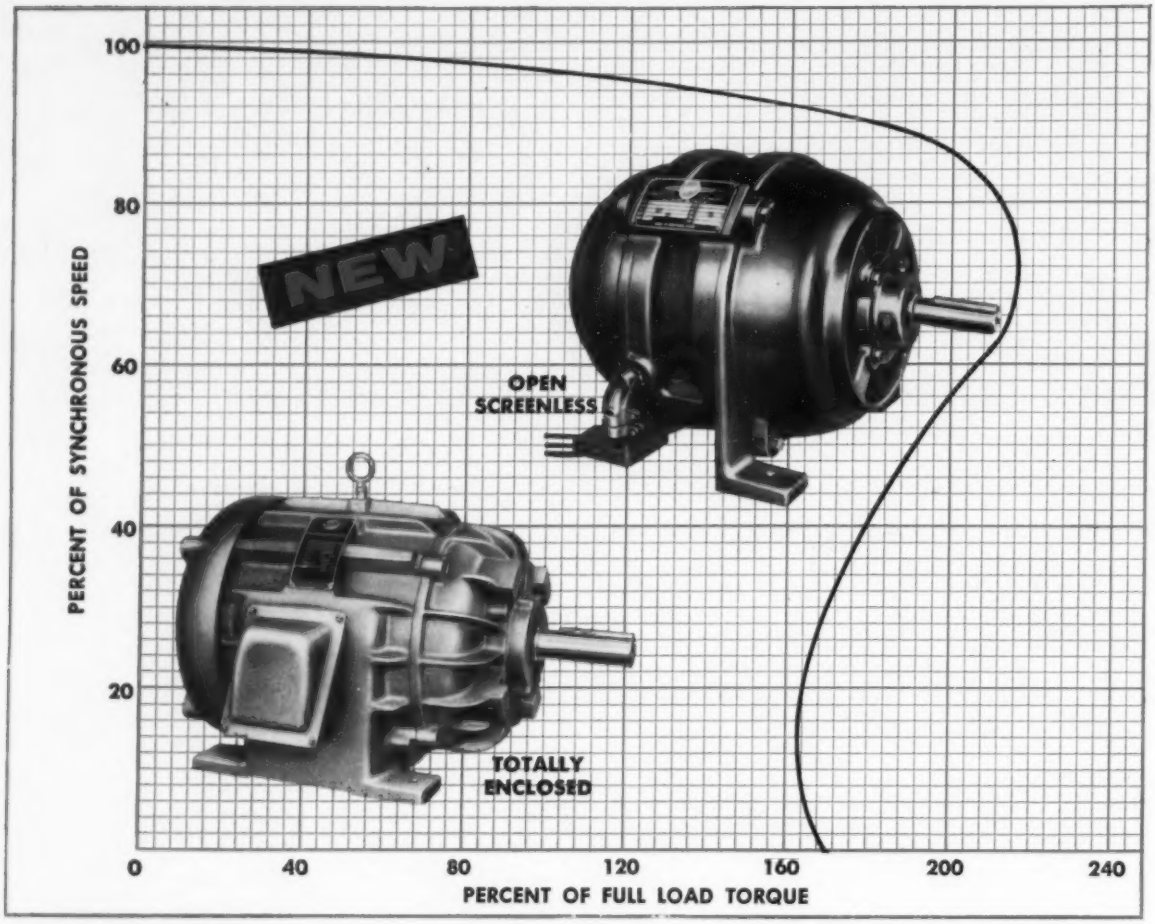

DIEHL* *"Smooth-Accel"* TEXTILE MOTORS

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This new line of DIEHL "Smooth-Accel" Textile Motors meets the textile industry's requirements for motor drives with extra smooth and uniform acceleration characteristics, and incorporates design advancements which make this new line top-choice for the efficient operation of today's high speed textile machines.

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. . . these advantages are yours at no increase over standard textile motor prices! Before selecting your next motor drive for replacements, modernization or new equipment, get the DIEHL story about the New "Smooth-Accel" line.

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VIB

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At last...sweaters show their true colors!

Our new and different nylon for texturized yarn produces colors so rich, so beautiful, that they'll spark imaginative new ideas in sweater styling. The reason for this is because Enka's nylon takes dyes like no other nylon . . . difficult colors are achieved quickly and economically. This greater affinity for dyes also means an *evenness* of color that eliminates streakiness worries. And—it processes with the greatest of ease!

Texturized yarn of Enka nylon not only has the stretch . . . the bulk . . . and the spun look of conventional texturized nylon, it also is more comfortable because it's naturally softer, more absorbent and resilient. The affinity for dyes, absorbency and resiliency are all inherent characteristics which can only be found in Enka nylon. The technical explanation lies in the different molecular structure. Also, our nylon is produced on a continuous, not a batch, basis.

We'd like to tell you more about our nylon for texturized sweater yarn . . . about our plans for promoting to buyers and consumers. For the complete story, phone A. B. Harris, Jr., at OXford 7-6141, extension 26 in New York, or contact the Enka sales office nearest you.

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AMERICAN ENKA CORPORATION, 530 Fifth Ave., N.Y. 36, N.Y.
New York · Chattanooga · Greensboro · Providence
Producers of Rayon · Nylon · Yarns · Fibers

Textile Industries

Formerly "COTTON"

OCTOBER 1959 VOL. 123, NO. 10

CONTENTS

SPECIAL WASH-AND-WEAR FEATURE

114 Wash-and-wear: concept in evolution

Wash-and-wear is the biggest news in textiles since the first synthetic fiber, but a few problems must still be ironed out.

116 Creaseproofing agents for wash-and-wear finishing

A discussion of all the principal resins and reactants used in wash-and-wear finishing, with their good points and drawbacks.

128 Resin treating cotton knits

In less than five years, resin finishing of cotton knits has grown from 30% to more than 90% of output at Rockville Processing Co.

131 Fiber selection and fiber blending

How do you make a choice among the sixteen classes of man-made fibers and the five important natural fibers?

134 Wash-and-wear: where to?

Quality in easy-care textiles can't be obtained through careless and carefree procedures.

137 The 4 devils that plague wash-and-wear

How to exorcise the gremlins in dimensional stability, fabric stamina, comfort factor, and crease recovery.

140 The problems of washing wash-and-wear

Promoted for handling at home, wash-and-wear garments often go to the laundry—and finishers' mistakes sometimes make unhappy customers.

COTTON AND MAN-MADE FIBERS

145 Better cleaning, less variation

is provided by a combed yarn mill's simple opening line..

146 Textured yarn success story

Fast-moving company becomes important factor in a changing market.

152 Two ways to code fabrics

Systematic plan for keeping track of fabrics.

154 Do you check gear run-out too?

It may be the cause of some of your quality problems.

165 Get the most from your roving tester

Principles and operation of the Belger roving tester.

CONTINUED ON NEXT PAGE ►

Textile Industries contents for OCTOBER 1959 continued

WOOL

161 **New way to make carpets**
A new British method now in mill use is intermediate between tufting and Axminster

KNITTING

173 **Expedite f-f style changing**
Three aids fixers should have and things they should do to make style changes quickly and easily.

180 **Simplify Komet clutch adjustment**
Eccentric crank pins will keep clutches shifting smoothly and without dragging.

181 **Knitter hints No. 58**
Double-check needle alignment!

GENERAL AND TECHNICAL

133 Economic effects of wash-and-wear
136 AATCC focuses on wash-and-wear
139 Russians inspect U. S. wash-and-wear
148 Leadership emphasized at industrial relations meet
149 Wage incentives a problem?
151 Ask Wool Bureau which dyes to use for Si-Ro-Set process
151 A way to measure yarn crimp in cotton cloth at the loom
153 Making Army fabrics? Here's important data
164 Nonwovens coming of age in quality and quantity
171 Machines handle large-volume Causticaire samples
183 Take special care in winding short-yardage packages
185 Idea for spinners with slack-tape problems
185 Rewiring loom stop motions? Try this
187 British forerunner of automation?
188 Single drawing clearer cuts cleaning time
188 Does size-box-to-creel stretch affect yarn?
189 Weight keeps card comb speed constant

DEPARTMENTS

6 Shorts and remnants
16 Personal notes
32 Mill notes
97 News in brief
105 Technical developments
107 Executive views
109 Future events
183 How others manage
193 New product parade
211 Free booklets
222 Supplier notes
241 Advertiser's index

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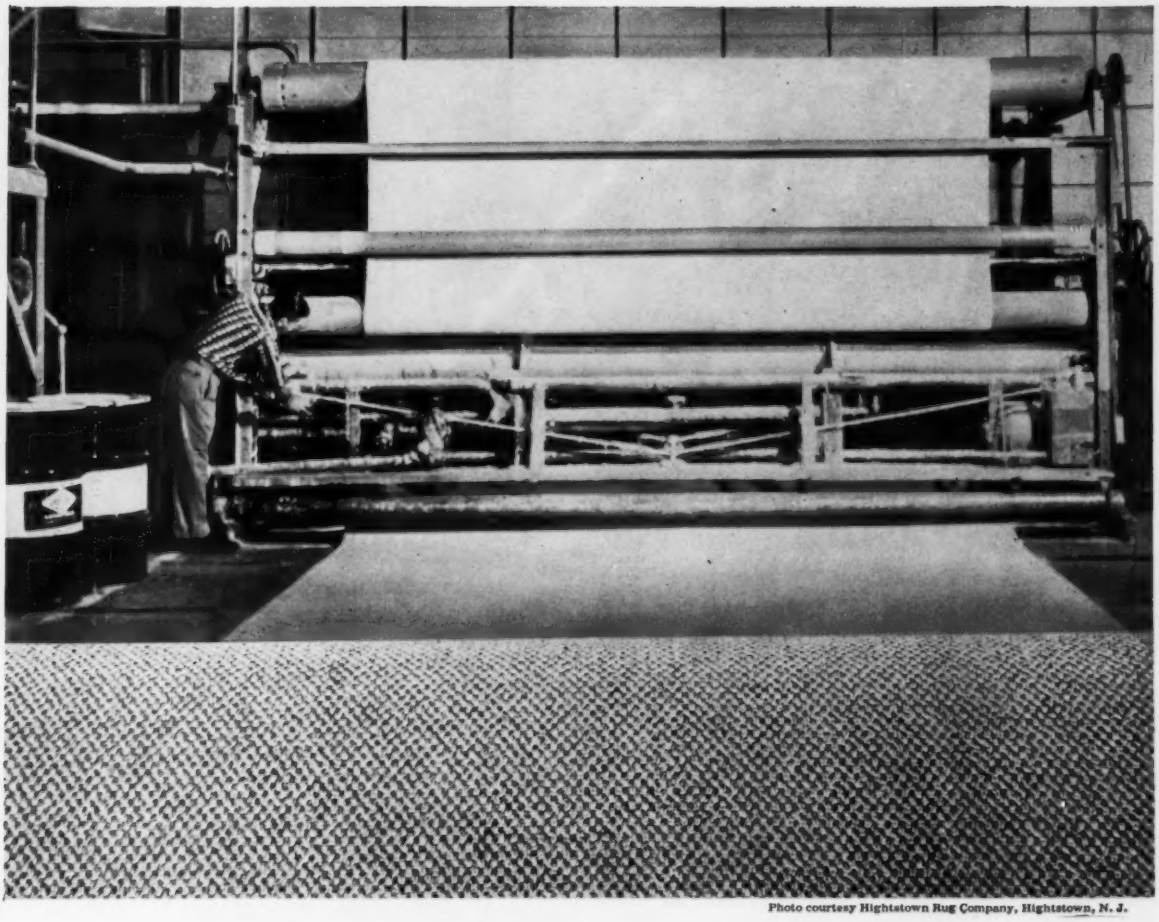

Photo courtesy Hightstown Rug Company, Hightstown, N. J.

Best way to back up a bright idea

Look closely and you will see that this is a *knitted* carpet—made by looping rather than weaving. Yet this carpet has the general appearance, good "hand" and wearing qualities of considerably more expensive woven carpeting – all of which adds up to a pretty bright idea.

How is this possible? It's due—in large part—to the backing, for the looser construction of knitted carpets demands a backing material of superior tuft-lock and fiber-binding characteristics. And these are the major reasons why one of the country's leading carpetmakers chose a combination of CHEMIGUM LATEX and PLIOVIC LATEX to back up its bright, new knitted line.

Other benefits of the backing include dimensional stability, excellent body, good color stability and nonskid properties. Moreover, it's easy to compound and apply, processes well and is permanent—thanks primarily to the CHEMIGUM LATEX.

Need a better backing for *your* bright ideas? CHEMIGUM LATEX may well be the answer. For full details – plus latest *Tech Book Bulletins* – write Goodyear, Chemical Division, Dept. J9439, Akron 16, Ohio.

GOODYEAR

CHEMICAL DIVISION

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SHORTS & REMNANTS

Ode to October

October—another AATCC Convention (Washington, 7th to 10th), another Missouri Day (the 6th), another N. C. Textile Manufacturers Association Convention (Pinehurst, N. C., 8th and 9th), another Pulaski Day in Nebraska (the 11th), not to mention Columbus Day on the 12th in most states, and Poetry Day on the 15th somewhere or other. And on page 113 of this issue starts another special TI feature on wash-and-wear.

Man-Made Fibers

TI's chart on the properties, uses, and trademarks of the man-made fibers is only two months old—it appeared in our August issue—but already there are several omissions, fibers which have made their appearance since the chart was published. Hartford Fibres' "Zantrel," for instance. With new fibers coming so fast, the chart has again proved very popular with readers. Among early requests for reprints were those from **M. Earl Heard,** v-p, West Point Mfg. Co., Shawmut, Ala.; **W. S. Heminway,** pres., Heminway & Bartlett Mfg. Co., Watertown, Conn.; **Wilmer D. Cressman,** public relations manager, James Lees & Sons Co., Bridgeport, Pa.; **C. A. Denson,** personnel director, Stonecutter Mills Corp., Spindale, N. C.; **Jack Coleman,** American Mfg. Co., Inc., Brooklyn, N. Y.; **Ralph M. Gutekunst,** The Hellwig Dyeing Corp., Philadelphia, Pa.; **Phil Schmidt,** prod. mgr., fabric division, Munsingwear, Inc., Minneapolis, Minn.; **F. Fuller Ripley,** treas., Troy (N.H.) Blanket Mills; **W. C. Witter,** The United Piece Dye Works, N. Charleston, S. C.; **P. S. Taylor,** asst. plant mgr., Kendall Mills, Walpole, Mass.; **J. H. Loomer,** Bruck Mills, Ltd., Montreal, P. Q.; **E. C. West,** v-p, Sauquoit Silk Co., Inc., Scranton, Pa.; **J. W. McCarty,** prof., Ga. Tech, Atlanta, Ga. (who wanted 100 copies for his students); **Alice L. Hinchliffe,** PA, Columbia Narrow Fabric Co., Shannock, R. I.; **Ralph V. Miller, Jr.,** PA, David Clark Co., Worcester, Mass.; **Joseph Hoskins,** Virginia Mills, Inc., Swepsonville, N. C.; **Roderick W. Smith,** USF-Aspin-

Amco Heliclone Loom Cleaner in Mayfair Mills, Arcadia, S. C.

Always "Working For Quality" at MAYFAIR MILLS...

AMCO HELICLONE® LOOM CLEANERS

Amco Heliclone Loom Cleaners, which provide automatic, continuous cleaning of 1676 looms at Mayfair Mills, are helping this famous manufacturer maintain his reputation for superb quality and top efficiency.

For the complete money-saving facts about Amco Loom Cleaners, call the American Moistening Company — an organization with more than 70 years' experience serving the textile field.

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MODEL 103
Exact Weight Scale for control of cone and spool weight. Request Form 3327.

Model 4104-A Shadograph for weighing samples in conjunction with Sheffield Micronaire testing. Dial available with centermark only or calibrated over and under in grains or grams.

For complete details on the full line of Exact Weight Scales especially designed for use in control operations, write for Form 3328.

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SHORTS & REMNANTS

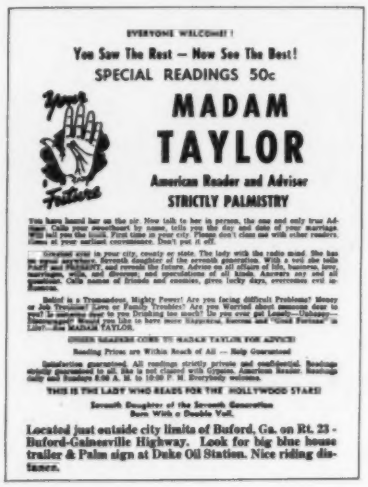
(from page 6)

ook Finishing Div., Gera Corp., NYC; **John C. Simkevich,** senior res. chemist, Personal Products Corp., Milltown, N. J.; **R. A. Scheiderbauer,** tech. supt., Du Pont Co., Chattanooga, Tenn.; **Robert T. Adams,** editor, *Underwear News,* NYC; **H. W. Stiegler,** dir. of research, AATCC, Lowell, Mass.; **Francis M. Shore, Jr.,** textiles division, U. S. Tariff Commission, Washington, D. C.; **Rodney Whitaker,** deputy dir., cotton division, USDA, Washington, D. C.; **J. A. B. Athey,** res. fellow, Ontario Research Foundation, Toronto, Ont.; and **H. Thornton,** T. M. M. (Research) Ltd., Rossendale, England.

Free reprints of the chart are available, on the basis of one per reader.

► We hear that black is now pushing out Madison Ave. gray in men's suits. One version is "Black Caviar."

►For those who like their advertising straight, we present Madam Taylor:



EVERYONE WELCOME!!

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SPECIAL READINGS 50c

Your Future Told

MADAM TAYLOR

American Reader and Advisor

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You have heard her on the air. Now talk to her in person, the one and only true Advisor. Calls your sweetheart by name, tells you the day and date of your marriage. Will tell you the truth. First time at your city. Please don't class me with other readers. Come at your earliest convenience. Don't put it off.

Located just outside city limits of Buford, Ga. on Rt. 23 - Buford-Gainesville Highway. Look for big blue house trailer & Palm sign at Duke Oil Station. Nice riding distance.

We stopped by, held out our hot little palm to her, and asked for some scuttlebutt on the future of the textile industry. Her eyes glazed and she passed into a deep trance from which we couldn't awaken her. So we tip-toed out, without even having heard her call the names of our friends and enemies, and without a single evil influence overcome.

Book Cover Department

Fake Book Jacket Co., New York, advertises "You can't judge a book by its cover," and for a quarter sells professionally designed book jackets with such double-talk titles as: "How to Lose Gracefully at Russian Rou-

MORE THAN 3½ MILLION SPINDLES NOW EQUIPPED WITH ROBERTS HIGH DRAFT

ROBERTS SPINNING NEWS

PUBLISHED BY ROBERTS COMPANY SANFORD, NORTH CAROLINA

WM-2 SANFORD, NORTH CAROLINA, U. S. A. 1959

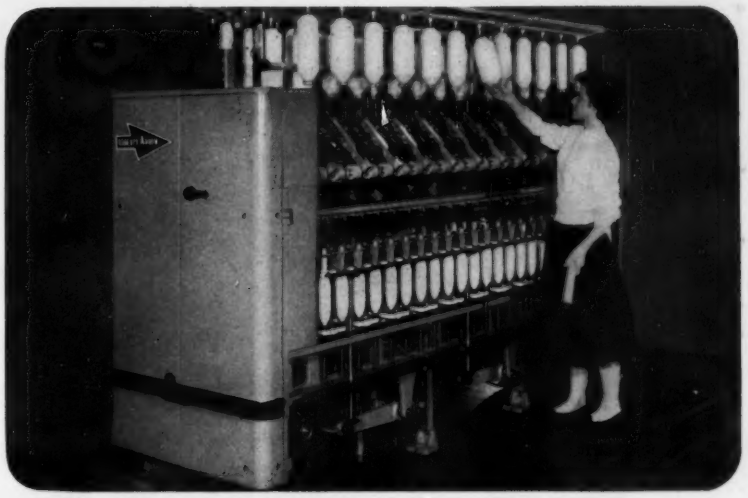
ARROW WM-2 LONG FIBER SPINNING FRAMES OFFER WIDEST YARN MAKING VERSATILITY

A dynamic program of new product design, advanced styling and aggressive merchandising is underway by all segments of the Textile Industry.

Knitting yarns of higher quality and greater interest are being called for in worsted, synthetics and blends. Finer weaving yarns up to 2 ply 80's are being called for and a great many blends are currently being explored. The longer fibers are in wide demand and the next few years should see a substantial boom in this field.

The demand for high bulk knitting yarns and the finer weaving yarns plus all of the newer fabric effects being created require fiber lengths from 3 to 8 inches long.

ARROW WM-2 frames are suitable for making yarns in any fiber length from 1½ to 8 inches. They provide great versatility in handling 100% synthetics, blends of synthetics, 100% worsteds and blends of worsted with synthetics in this range. Better quality yarns with greater evenness, bigger package sizes and higher production speeds are produced on ARROW frames.



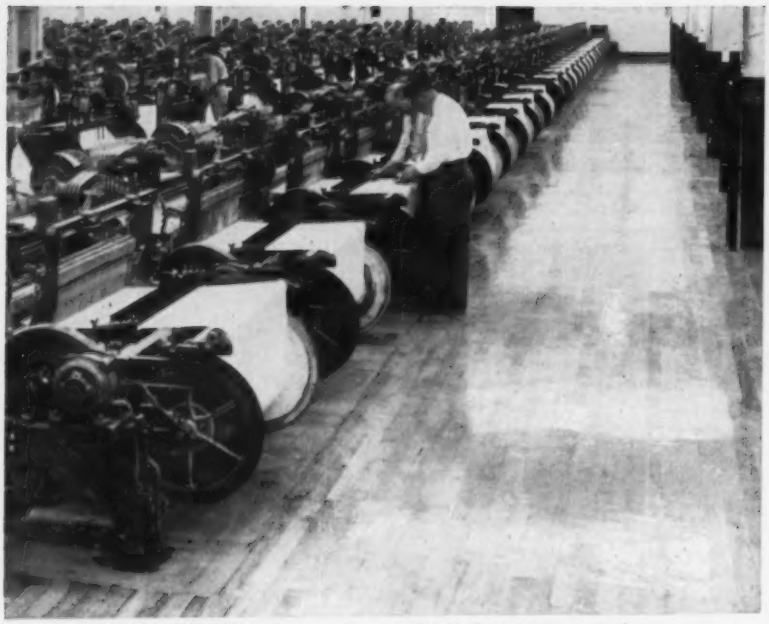
- Spins yarn from any natural or synthetic fiber or any blend.
- PermaSet Drafting handles any fiber length from 1½ to 8 inches
- No roll setting changes needed at any time
- Great versatility for changing yarn numbers, twist, draft, ring size, and spindle speed
- Drafts as high as 24 on worsted, 60 on synthetic
- Produces yarn with better evenness and greater breaking strength
- Ball bearing top and bottom rolls eliminate all lubrication in drafting zone
- Almost ideal spinning conditions from delivery roll to spindle
- Runs at higher front roll, traveler and spindle speeds
- Reduces ends down by more than 50%
- Puts twice as much yarn on the bobbin as older frames
- 12-inch bobbins reduce winding costs
- Very rugged, most durable machine ever built for yarn spinning
- Frame is built in the wide-stance 36-inch width
- Uses ball bearings at every moving, turning or oscillating motion
- Substantially lowers electric power consumption
- AeroCreel for single or double roving
- Frame arranged for practical application of overhead cleaning and vacuum floor sweeping

Roberts ShortFlo System for Making Long Fiber Yarns

Roberts Company offers complete technical service in adapting its ShortFlo System for the production of long fiber yarns. This includes the complete yarn manufacturing process starting with tow converters, blending machines, pin drafting, roving frames, spinning frames, winders and twisters.

Where mills have existing equipment, full consideration is given to utilizing it whenever possible. Or, if a new long-fiber program is planned, all machinery can be specified, and the complete yarn organization set up.

The ShortFlo System for making long fiber yarns requires a minimum number of processes. Many doublings are provided to insure exceptionally good blending of fibers, improved evenness and better strength.



TENNANT-SEALED weave room floors are bright, dirt-resistant, easy to clean.

How your TENNANT Floor Specialist helps you save ⅓ in floor care costs

Would you like your mill to have floors as bright and clean and durable as this? And at an annual cost up to a third less than you're now paying?

Your TENNANT Floor Specialist *can show you how.*

Makes floors dirt resistant. He can demonstrate, for example, the exclusive TENNANT SYSTEM process that actually makes your floors up to 3 times more resistant to dirt. And when they *do* soil, dirt wipes off easily in a fraction of the usual time.

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Used in 1000 major mills. More than 1000 of America's leading mills are now saving money by using the complete TENNANT SYSTEM of floor care. And most are following an *individualized* program which their TENNANT Man developed to fit their specific needs in each department.

WRITE TODAY *for an analysis of your floor care problem. You may be surprised at the saving you can make.* G. H. Tennant Co., 735L No. Lilac Drive, Minneapolis 22, Minnesota.

TENNANT

The Textile Industry's Most Widely Used

FLOOR MAINTENANCE SYSTEM

Methods

Machines

Materials

FLOOR MAINTENANCE SYSTEMS

SHORTS & REMNANTS

(from page 8)

lette;" "Lincoln—The Man and the Car," by John Wilkes Booth; "How to Cheat the Federal Government on Your Income Tax;" and "A Condensed History of Fingernail Biting," by Venus de Milo.

Save Your Confederate Money

A southern mill, to remain nameless for reasons that will be obvious, published "A Salute to a President" in its June issue, honoring Jefferson Davis, president of the Confederacy, on the 151st anniversary of his birth. Attached to the page with Scotch tape was a small Confederate flag, and neatly attached to the flag was a small tag—"Made in Japan."

TI Goes Underground

"I will appreciate receiving a copy of your magazine for me reference purposes."

/s/ Lou
(LOUIS F. FONTANA)
Vice-President
Irving Subway Grating Co., Inc.
Long Island City, N. Y.

► I'm adding this to me list of unlikely readers of TI—pizza kitchens, shoe repair shops, hi-fi shops, horse breeding farms, automotive repair shops, and the American Legion.

"Keep Talking"

"Thank you for reproducing my *Avondale Sun* article ["Like Rats Off a Sinking Ship," which discussed the problem of U. S. subsidies on exported cotton] in your recent issue. Our only hope of getting something done about this problem is to keep talking about it."

J. CRAIG SMITH
Pres. & Treas.
Avondale Mills
Sylacauga, Ala.

Reprint Requests

Fifty reprints of "Battery Filling Streamlined" (TI for June 1959), plus permission to use in an operator training program—**Jim Waldrep,** Pacolet Mfg. Co., New Holland, Ga. The article was not reprinted, but copies of the chart, "Look, Battery Fillers . . . It's Easier This Way," which accompanied it, are available.

Copies of TI's chart giving a state-by-state breakdown of the location of the textile industry—**Gaston Gage,** dean, school of textiles, Clemson (S. C.) College.

Three copies of "How Many Fibers per Yarn Cross Section?" nomogram (TI for June 1959)—**W. D. McManus,**

ELIMINATE THE FIRE HAZARD!

Clean and Rustproof Textile Equipment with

NON-FLAMMABLE, NON-TOXIC

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IMMUNOL is safety insurance. Replace flammable solvents with this non-flammable, non-toxic solvent and you'll get these outstanding benefits:

SAFETY—IMMUNOL can be used anywhere in the plant without danger of fire. In addition, it will not harm fabric or workers' skins. It is odorless so workers will not be affected when it is used.

FASTER CLEANING—IMMUNOL quickly removes dirt, dust, oil, grease, soil, etc. from every kind of textile equipment. It cleans faster than ordinary solvents and it can also be used to clean woodwork, plastic and enameled surfaces.

ECONOMY—1 part IMMUNOL to 20 parts water, either hot or cold, hard or soft, is sufficient for all cleaning operations. The cost of this mixture is less than 13c per gallon.

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Textile mills throughout the country have been using IMMUNOL with outstanding success—and safety—for years. Write, wire or call for a free sample today.

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DAvenport 4-4000

Service Representatives in Principal Cities

Careful records prove that National-Sterling Ring Travelers not only upgrade production but boost yarn quality to new levels. Here's why:
Our sales engineers make field tests in your own mill before recommending any particular weight or style of traveler. No detail is left to chance . . . no "make-do" substitutes are considered. The final choice is the *right* traveler — a traveler which will consistently deliver more pounds of first class yarn, at higher spindle speeds, with fewer ends down. And the records prove it.

Why not prove it for yourself? Whether you're running cottons, wools, synthetics or blends, let an experienced National-Sterling Engineer help you select the *right* ring traveler for your particular requirements right in your own mill. Write, wire or phone National Ring Traveler Company and Sterling Division, 354 Pine Street, Pawtucket, R. I. Southern Office and Warehouse: P. O. Box 293, Gaffney, South Carolina.

NATIONAL Sterling
RING TRAVELERS

F. L. CHASE, JR., *Pres. & Treas.* L. E. TAYLOR, *Southern Mgr.*
FOR SPINNING AND TWISTING ALL NATURAL AND SYNTHETIC FIBRES
There's a NATIONAL man nearby!

H. B. ASKEW, P. O. Box 424, Griffin, Ga.
T. H. BALLARD, 112 N. 9th St., Belmont, N. C.
F. S. BEACHAM, P. O. Box 511, Honea Path, S. C.
J. T. GREENLAW, Glen Haven Circle, Saco, Maine

Export Agent: A. M. ROMERO CORP., 350 Fifth Ave., New York 1, N. Y.

SHORTS & REMNANTS

(from page 10)

J. P. Stevens & Co., Inc., Greensboro, N. C. Also requesting copies were the librarians at General Tire & Rubber Co., Akron, O., and Dow Chemical Co., Williamsburg, Va.

Two copies of "How Much Inventory?" (TI for August 1959)—**Robert G. Laidlaw,** managing dir., J. & P. Coats (Canada) Ltd., Montreal, P. Q.

Reprint of "This Is Textiles, U. S. A." (TI's series of ads in *Industrial Marketing*)—**Stephen I. Rudo,** dir. res. & dev., Werner Textile Consultants, Larchmont, N. Y.

Reprint of "Identification of Dyestuffs on Textiles" (TI for Jan. 1958) —**Fritz Raff,** Ciba Co. Inc., NYC.

► P. F. Van Vlissingen & Co.'s Katoenfabrieken, Helmond, Holland, writes for a copy of "Cotton Fibre Properties, Spinning Efficiency and Fabric Quality as Affected by Grinning Practices." Smilingly, we replied that they should get in touch with the National Cotton Council, who published the desired pamphlet.

Likes Art Work

". . . I'd like to commend you on TI's new pictorial work on each article. This brightens up the article tremendously, and my reaction to it was that TI is really up to date. I'm referring to the Georgia Operating Executives meeting report on big packages and metallic clothing. If this be a plug—make the most of it."

J. L. Delany
Gen. Supt.
Joanna Cotton Mills Co.
Joanna, S. C.

Wall-to-Wall Music

WRCA radio in New York City now has what it calls "wall-to-wall" music, which it first introduced at Bigelow-Sanford Carpet Co.'s NYC showroom. But WNEW, a rival station in New York, makes light of the whole thing—it claims to have "scatter-rug" music.

"Lavado sin Planchado"

That's Spanish for wash-and-wear, we understand, but **A. Goldfarb,** United Merchants and Manufacturers, Inc., asks for a reprint of the special wash-and-wear section which appeared in TI for October, 1958. ". . . proven extremely interesting to our foreign affiliated mills," he says. Well, we don't have any reprints of that section left—our supply was exhausted filling reader requests—but see page 113 of this issue

HARSHAW UVERSOFT "D"

imparts soft hand with little reduction in moisture absorbency

● UVERSOFT "D" is a cationic surface active agent which produces a full, soft hand with little, if any, reduction in moisture absorbency of the TREATED material. It can be exhausted from a long bath, and has an excellent retention in an aqueous system. UVERSOFT "D" provides a maximum economy in application and use.

UVERSOFT "D" is an outstanding anti-static agent. It should be considered for situations where the accompanying softening action is not objectionable.

Send for folder containing complete technical information.

THE HARSHAW CHEMICAL COMPANY ● 1945 East 97th St., Cleveland 6, Ohio

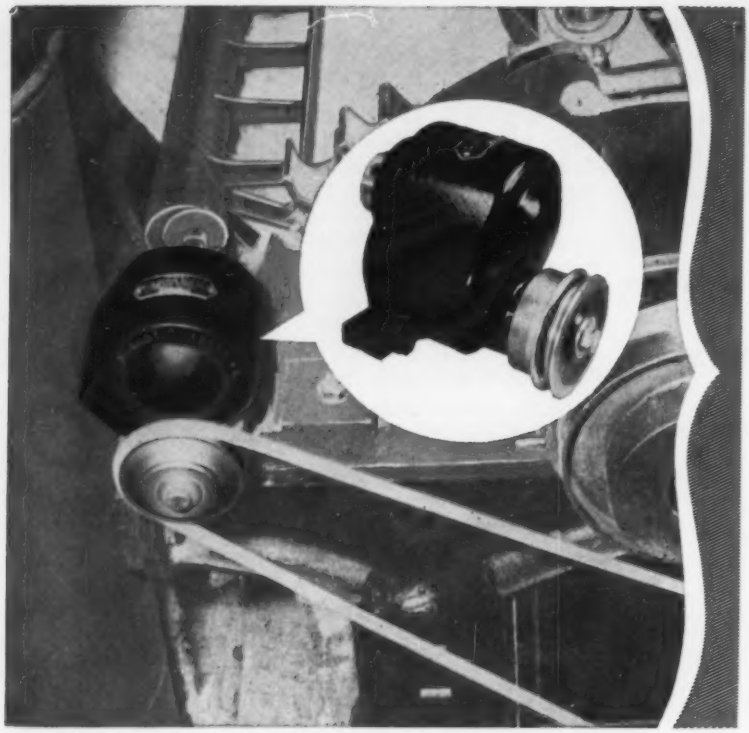
Send me TECHNICAL BULLETIN ON UVERSOFT "D"

My Name_____

Company Name_____

Street Address_____

City_____ Zone____ State_____



OUTSTANDING SUPERIORITY OF SOUTHERN STATES COMB BOXES PROVED IN NATION'S MILLS

More than 50,000 Southern States Comb Boxes have been placed in service during the past 11 years—equal to **60%** of all the nation's cotton cards. Many mills have changed over 100%.

This overwhelming acceptance proves conclusively that mills can easily justify the small investment. Cardroom overseers quickly recognize the savings that result from their use: no oiling, cleaning or maintenance for the life of the unit; steady, even strokes to drive the comb with perfection; elimination of hot-running, leaky, rattling old-style boxes and their headaches.

Southern States Comb Boxes are furnished complete with an adjuster base for mounting on any make of cotton card. Bases are double tapped to permit rapid mounting on either right or left hand cards. Installation is quick and easy.

Let us show you with facts and figures how it has paid hundreds of mills to install Southern States ball-bearing, sealed-for-life, Comb Boxes; prove how much they will save you in one year. Write direct for a representative to call at your convenience.

SS

SOUTHERN STATES
EQUIPMENT CORP.
HAMPTON, GEORGIA

SHORTS & REMNANTS

(from page 12)

of TI for another special section, giving the latest on wash-and-wear. And we have a few reprints.

Pro and Con on the Labeling Act

The Dyer, a journal published in England, comments editorially on the Textile Fiber Products Identification Act, scheduled to become effective in this country next March 3: "With the increasing diversity of manufacture of synthetic fibres, one feels some sympathy for the textile salesman of the future who may or may not be perfectly confident that what looks like nylon is indeed a manufactured fibre in which the fibre-forming substance is any long-chain synthetic polyamide having recurring amide groups [that's the way the Federal Trade Commission defines nylon—minus the British spelling of "fibre"]."

But with all the complaints about the Labeling Act, one group is quite happy about the whole thing—the woven label and tag manufacturers, who estimate that the textile industry will have an initial requirement of 10 billion tags to comply with the law.

And speaking of the TFPIA, here are a few who have requested reprints of "Highlights of the Labeling Law," by Jules J. L. Hessen and James C. Slaughter, which appeared in TI for August 1959: **Ernest G. Freudenthal,** Werthan Bag Corp., Nashville, Tenn.; **F. R. Marlier,** chairman of the board, Waynesboro (Pa.) Knitting Co.; **Charles J. Mozur,** pres., Mozur Laces, Inc., Wilmington, N. C.; **Erwin Rauser, Jr.,** pres., Shorewood Mills, Milwaukee, Wis.; **Mrs. Audree Anthony,** Cone Mills Corp., Greensboro, N. C.; **C. W. Moore,** pres., Quality Weaving Co., Philadelphia, Pa.; **G. N. Davidson,** PA, West Point (Ga.) Mfg. Co.; librarian, U. S. Testing Co., Hoboken, N. J.; **B. P. Lindley,** v-p, Kaumagraph Co., Wilmington, Del.; **S. A. Shuman,** Karff-Eisemann Co., Philadelphia, Pa.; **F. W. Glahe,** Wilson Athletic Goods Mfg. Co., River Grove, Ill.

A few reprints of the article are still available.

Weaves Samples

"There are enough mills in this country to take care of production runs, but when it comes to short yardages or small samples, you are at a loss where to find such a service, as your letter in Shorts & Remnants

—TI May page 10—found out.

"To help management in this situation we have established in New York City a shop where we not only design fabrics but weave them right on the premises . . . inches . . . and yardage."

MANFRED GOLDSCHMIDT

203 E. 18th St.
New York, N.Y.

Wants Duck

"We would like more information on the news item which appears on page 55 of the July issue of TEXTILE INDUSTRIES . . . about the Army's sale of duck."

W. F. CRAIN

Lawtex Corp.
Dalton, Ga.

► The Quartermaster General, Department of the Army, Washington 25, D. C., can give information on when and where this surplus duck will be sold.

Miscellaneous Wants

More information on Reiner 170" tricot knitter—**E. F. White,** Gayley Mills, Marietta, S. C.

Names of Manufacturers of afghans —**F. A. Kuenzel,** pres., The Kuenzel Mills Co., New Bremen, O.

Further data on Shell's Eponite 100 resin—**T. S. Fearn,** supt., Artistic Weaving Co., Pompton Lakes, N. J.

More information on Signode's steel strapping—**Arthur Robbins, Jr.,** PA, Opp & Micolas Cotton Mills, Opp, Ala.

Details on Gran-O-Top granular card conversion—**C. E. Gobeille,** gen. supt., Domil, Ltd., Sherbrooke, P. Q.

More data on Moyno pumps—**C. P. Roberts, Jr.,** Dover Mill Co., Shelby, N. C.

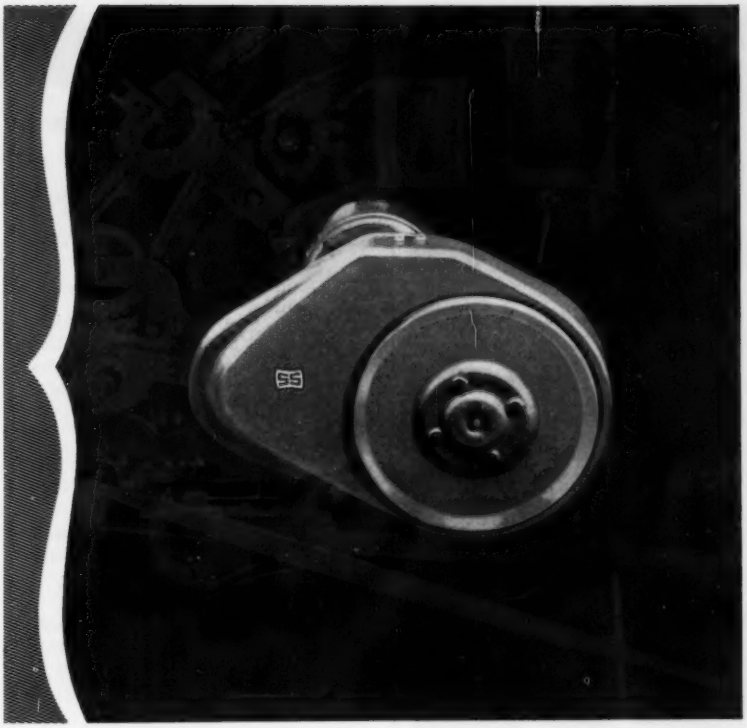
Copy of H. W. Butterworth's "Guide for Submitting Suggestions" —**Paul Szabo,** Dominion Textile Co., Ltd., Montreal, P. Q.

Further information on Red-Ray's gas burners—**Richard S. Spanjian,** Spanjian Sportswear, Pasadena, Calif.

Who makes machines for knitting elasticized fabrics and nylon net?— **James R. Ballentine,** mgr., Foreign Trade Bureau, Trade and Convention Center, City of Philadelphia.

More information on items mentioned in J. B. Goldberg's article, "Textile Research Achievements in 1958" (TI for Feb. and Mar. 1959) —**H. C. Donaldson, Jr.,** Cluett, Peabody & Co., Inc., Troy, N. Y.

Name and maker of cloth inspection apparatus (TI for August 1959, p. 79)—**O. P. Beckwith,** Q. C. dir., The William Carter Co., Needham Heights, Mass.



SOUTHERN STATES CD-2 CARD DRIVE COMBINES INTO ONE UNIT ALL OF THE FEATURES WANTED FOR COTTON CARDS

Here is why we honestly believe the Southern States CD-2 Card Drive is the safest, simplest, most efficient individual drive on the market today:

Finger-tip control. No changes in operating procedure. Unit is controlled by simple clutch lever in both starting and hand stripping.

Full speed in seconds. A 1½ hp high torque card motor brings card into full operation, seconds after clutch is engaged.

Safety engineered. All belts and moving parts are covered. Starting and idling is accomplished by simple clutch lever.

Rugged construction. The entire unit is built for heavy-duty service: steel main stand; cast iron jackshaft bracket and main pulley; cast aluminum cover. Ball bearing throughout.

Easy installation. Fits any cotton card. Minimum number of holes to drill in frame. Drive pulley, collar and clutch are preassembled and slip on to shaft using existing keyway.

Get the facts from your Southern States representative or write for Bulletin 301-a.

SOUTHERN STATES
EQUIPMENT CORP.
HAMPTON, GEORGIA

are you struck by STATIC?

The SIMCO "*Midget*" electronic static eliminator is *guaranteed* to end your static problems . . . safely, inexpensively . . . in all textile applications. The "*Midget*" consists of a power unit and one or more static bars, designed to fit any machine. Anti-static cleaning devices and meters for locating and measuring static are also available.

Equip your machinery now.

the SIMCO company
920 Walnut Street, Lansdale, Pa.

PERSONAL NOTES

Edward T. Richards, superintendent of Peerless Woolen Mills' Rossville, Ga., plant, has been named manager of the company's Tifton, Ga., mill.

Union Bleachery, division of Cone Mills Corp., Greenville, S. C., recently announced the promotion of **William Adger Bishop, Jr.,** to assistant of all phases of vat and sulfur jig dyeing.

J. A. Taylor has joined Johnston Woolen Mill, a division of Excelsior Mills worsted section, Johnston, S. C., as technical superintendent.

Hess, Goldsmith & Co., Inc., a division of Burlington Industries, Inc., has named **James R. Lathan** a vice-president, as divisional manager of fiber glass manufacturing and finishing. * * * **P. C. Stott** has been made plant manager of the Altavista Weaving Company. * * * **Charles M. Travis, Jr.,** has been named president of Burlington Tricot Fabrics Co. * * * **S. Frank Johnson** has assumed his duties as office manager of the Peerless Textiles plant, Cleveland, Tenn. * * * **Noel E. Garvin** has been transferred to a divisional manufacturing position in the executive offices. * * * **M. Riggs Goodman,** formerly superintendent of weaving at Brighton Mills, Shannon, Ga., has become manager of the Cascade Weaving Co. * * * **George E. Norman, Jr.,** has been elected a vice-president, with headquarters in Greensboro, N. C. * * * **C. Lowrey, Jr.,** and **William R. Landa** have been elected vice-presidents with headquarters in New York. * * * **Sam S. Homewood** has assumed his duties as general superintendent at the Raeford plant. * * * **R. Neil Ross** has been promoted to plant manager of Pacific Mills plant.

Gerard A. Roy, formerly superintendent of the Orlon division of National Spinning Co., Inc., Washington, N. C., has been promoted to plant manager. * * * **Charles Quirion,** formerly superintendent of the Textralized division, has been promoted

Continued on page 22

Save On Speed Reduction Costs

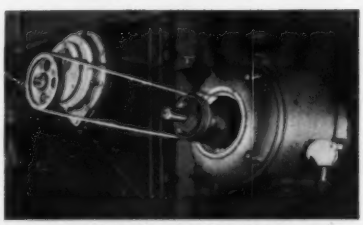
WITH A Lovejoy

Shaft Mounted
GEAR REDUCER

COSTS LESS THAN OTHER SHAFT MOUNTED REDUCERS

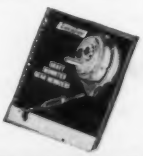
- **Eliminate supporting structures and shaft couplings required by conventional reducers.**
- **End alignment, simplify belt tensioning problems.**
- **Save space in any drive arrangement . . . mount vertically or at any angle.**
- **Install easily on new or old equipment.**

Eighteen stock models: 8 to 425 rpm.; fractional to 120 hp.; 4.5:1 (single reduction), 14.7:1 (double reduction) nominal ratios.



Lovejoy Shaft Mounted Gear Reducer and Lovejoy Variable Speed Pulley provide an efficient, compact combination for driving a battery of drying vats. Simple adjustment of rod and turnbuckle maintains proper belt tension.

Request prices and Catalog R-58.



LOVEJOY FLEXIBLE COUPLING CO.
4850 WEST LAKE STREET • CHICAGO 44, ILLINOIS

Spartan Mills leads with NEWEST in Frame Cleaning

To keep more frames cleaner than ever before, Spartan Mills is first with the newest combination for cleaning:

1 BAHNSON CROSS-JET CLEANER

- Flexible trunks for each side of frame clean creel, drafting system, and frame. Multiple air nozzles in trunks provide total frame cleaning.
- High air handling capacity with adjustable air volume for each area of frame.
- Oscillating air outlets provide 180° overhead cleaning, plus track and conductor bar cleaning.

2 BAHNSON VERT-I-RAIL TRACK

- First modern creel-mounted, single rail I-beam track offered for frame cleaners.
- Wider surface for wheel contact results in minimum track wear, maximum track life.
- Shielded conductors are open at top and bottom for easier air cleaning and maintenance.

Bahnson **AIR-O-MATION**

AIR AT WORK FOR INCREASED PROFITS

THE BAHNSON COMPANY, WINSTON-SALEM, N. C.

New STEROX® 21-K streamlines fulling up to 43% – delivers excellent hand whiter whites!

Clothes by Sporteen and Derby Sportswear. Fabrics by Guilford Woolens.

On a performance basis, Monsanto's unique STEROX 21-K gives you these exclusive advantages:

Substantially cuts your total chemical costs because STEROX 21-K works so efficiently on the acid side, retains its efficiency at low processing temperatures, eliminates the numerous chemicals you now use for effective fulling and scouring.

Reduces your handling and storage problems because you use fewer chemicals, require no hazardous or concentrated acids.

Increases your mill production because STEROX 21-K shortens scouring time, rinses out readily, boosts output per hour.

Cuts your processing costs because you save on labor, water and power per yard of fabric.

Improves your goods because STEROX 21-K produces stronger fabric than alkaline fulling agents, gives softer hand and sharper colors than other acid fulling agents, cleans without leaving spots and streaks, leaves no "yellowing" residue or after-odor.

and scouring – cuts chemical costs – bright, sharp colors –

See *how much* new STEROX 21-K cuts costs and saves time . . . how many chemicals it eliminates. Check the six commercial runs (below)

IN PRODUCTION RUNS ON THESE TYPICAL FABRICS:	COMPARED TO THESE OFTEN-USED CHEMICAL TYPES OF ACID FULLING AGENTS:	STEROX 21-K GAVE THESE RESULTS: CUT CHEMICAL COSTS...	ELIMINATED THESE CHEMICALS...	CUT TOTAL PROCESSING TIME BY...
35% Wool/65% Orlon, 9 oz./yd.	Alkylolamide	40%	Acid, water-softener, alkali	40 minutes
55% Wool/45% Rayon, 11 oz./yd.	Alkylolamide	25%	Acid, water-softener, alkali	20 minutes
100% Wool, 17 oz./yd. Melton	Alkylolamide plus Fatty Acid Amide	42%	Fabric softener, acid, water softener, alkali	40 minutes
50% Wool/ 30% Orlon/ 20% Nylon, 25 oz./yd.	Alkylolamide	13%	Acid, alkali, water softener	15 minutes
85% Wool/ 15% Nylon, 13.5 oz./yd.	Alkyl Aryl Sulfonate and Fatty Acid Amide	43%	Acid, alkali, water softener	1 hour and 40 minutes
85% Wool/ 15% Nylon, 14 oz./yd.	Alkyl Aryl Sulfonate and Fatty Acid Amide	22%	Acid, alkali, water softener	55 minutes

Developed by Monsanto, STEROX 21-K is distributed by these two leading firms. Write or call today.

Monsanto

Where Creative Chemistry Works Wonders For You

TEXIZE CHEMICALS, INC.*

GREENVILLE, S. C. PHONE: CEdar 5-6367

*Licensed to manufacture as well as distribute STEROX 21-K.

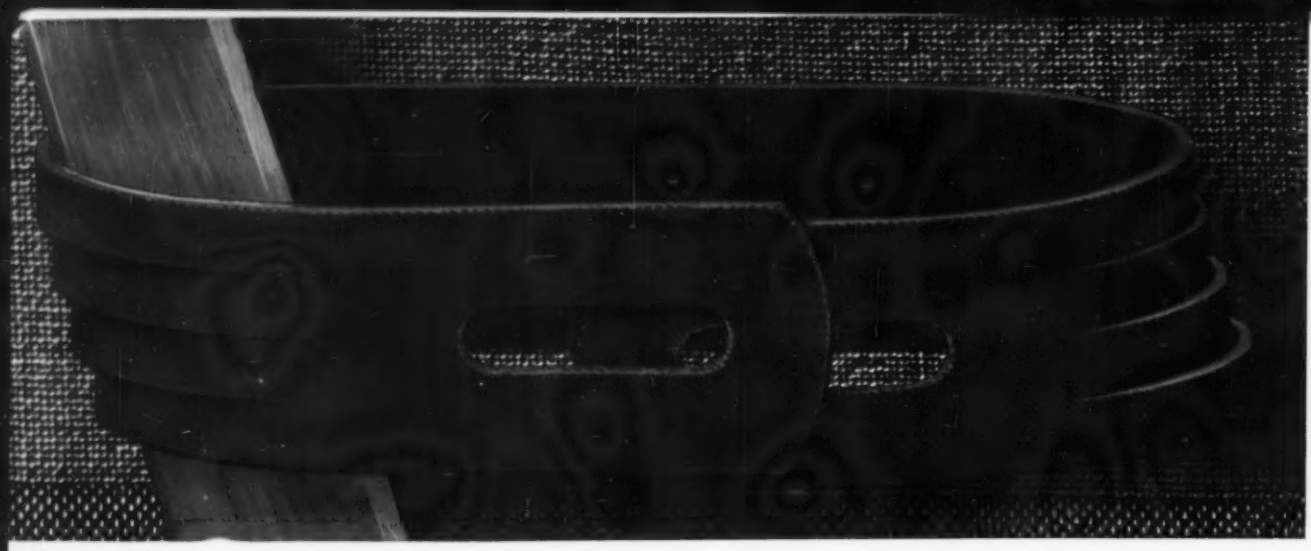
Texize

TEXTILE ANILINE & CHEMICAL CO.

LAWRENCE, MASS. PHONE: MUrdock 3-8726

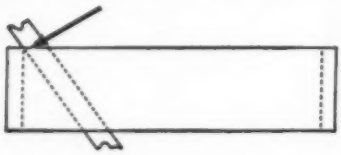
TEXTILE ANILINE & CHEMICAL CO.

STEROX: Reg. T.M., Monsanto Chemical Company

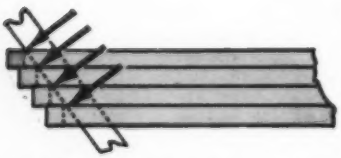


Gates 4-in-One Check Strap LASTS up to 3 TIMES LONGER

New Checking Principle is Secret of Longer Wear—



With the ordinary one-piece check strap, all shock and wear from the picker stick are concentrated at one point.



Gates 4-in-1 Check Strap is built with four separate bands. As the checking action begins, a portion of the picker stick force is absorbed by the top band—then in turn, the second, third and fourth bands each absorb a portion of the shock, providing a checking action that is smooth and even. Wear is distributed evenly over the entire width of the strap, increasing service life up to 3 times.

You Get These Important Benefits:

Unaffected by Changes in Humidity—no stretch or contraction—ready to go Monday mornings without time-consuming adjustments.

Stronger and Tougher than Leather—yet flexible and light in weight.

Absorbs Shock of Picker Stick—resilient and flexible—conforms to any action of the picker stick, absorbing blows and shocks.

Saves Installation Time—quickly installed and adjusted without removing picker sticks. No new brackets needed.

Competitive Price—even though Gates 4-in-1 Check Strap has many important advantages over ordinary straps, it is competitively priced. For faster, more economical production, equip your looms with *all* Gates *specially engineered* accessories . . . available from Gates Textile Distributors.

Gates Distributors are in the Yellow Pages

The Gates Rubber Company, Denver, Colorado

Gates — The Mark of *Specialized* Research

IPA-900

Take-up Roll Coverings
Card Bands
Cone and Evener Belts
Spinning Frame Drives

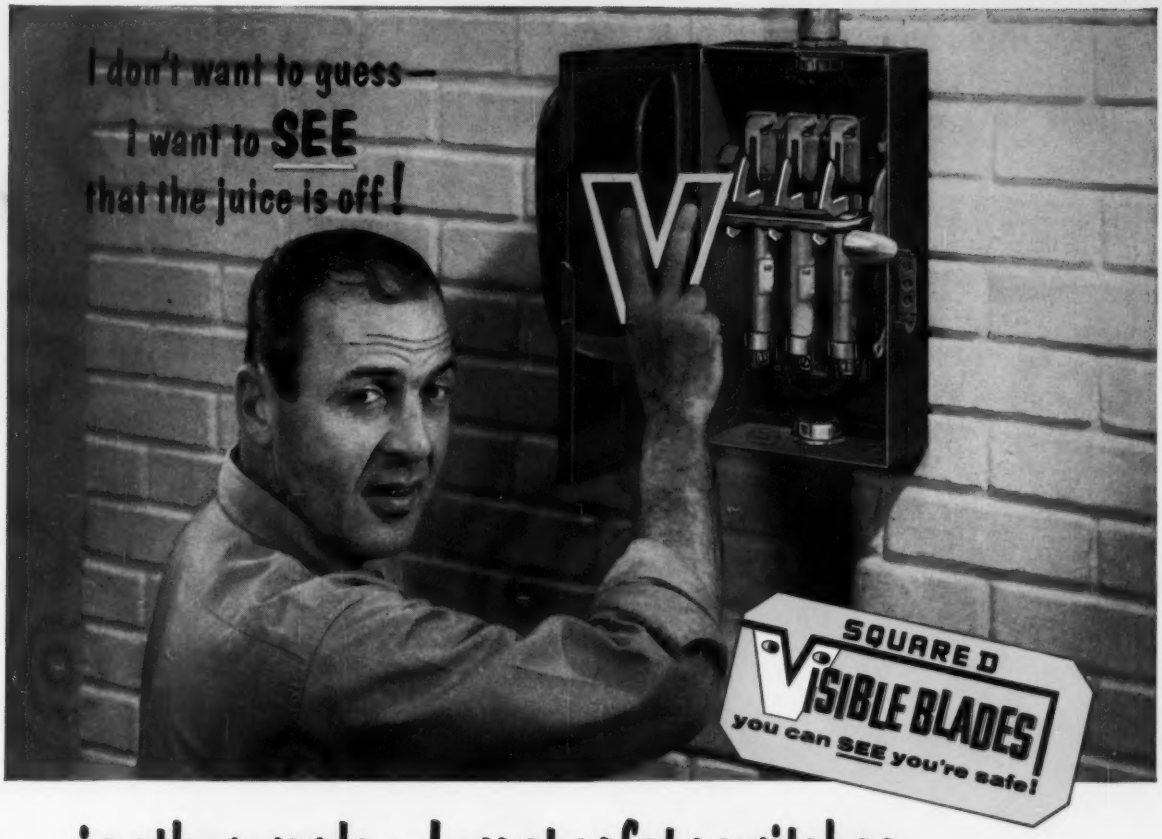
Reversible Pickers

Tex-Hide Harness Straps

Tex-Hide and Vulco Loop Pickers

Thin Tex, Vulco, Tex-Hide & Super Tex-Hide Lug Straps

Gates Textile Accessories

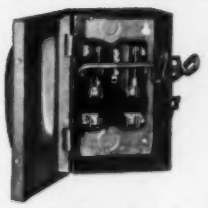


...in other words—I want safety switches with VISIBLE BLADES!

The men who pull the switches will tell you what can happen when a switch, *believed* to be open—*isn't.* A lot of things can happen—and every one of them is bad. Personnel is in danger. Motors can single-phase. Machinery and work can be damaged. Down-time can skyrocket.

Doesn't it make sense to insist on Visible Blade construction which gives you a road block against any of these possibilities? Doesn't it make equally good sense to insist on the safety switch which gives you that construction—plus a lot of other performance advantages?

NEW!
TYPE LD SWITCH



Quality Features at Low Price

Spring-operated quick-make, quick-break • Box lugs—Easy to wire—No looping • Compact enclosure, yet lots of wiring space • Positive pressure (spring loaded) fuse clips • Full horsepower ratings

EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT...NOW A PART OF THE SQUARE D LINE

SQUARE D COMPANY

Mr. Clay
Ohio Falls

Mr. Willingham
Ohio Falls

Mr. Holden
Ohio Falls

Mr. Race
Revonah

Mr. Millar
Revonah

Mr. Shafer
Revonah

to manager of the new Whitesville, N. C., plant.

Ohio Falls, Inc., of Louisville, Ky., has named **Cletus W. Holden** secretary-treasurer of the firm, and **Sidney W. Clay** to its board of directors. **W. Bernard Willingham** is the new president of the company.

Announcement has been made by Revonah Spinning Mills, Hanover, Pa., of the election of **Thornton C. Race** vice-president in charge of sales: **John D. Shafer,** vice-president in charge of manufacturing; and **James Millar,** vice-president in charge of research and development.

Riegel Textile Corp. has announced the promotion of **Robert E. Coleman** to the position of production planning and inventory control in the New York office. **William E. Ashley** has been named general superintendent of the grey mill division at Trion, Ga. * * * At the Ware Shoals, S. C., division, **Joseph Ernest** has been promoted to superintendent of slashing and weaving. **J. C. Cavin** has assumed his duties as assistant general superintendent of the finishing plant. **Dale Kern** has been named director of quality control.

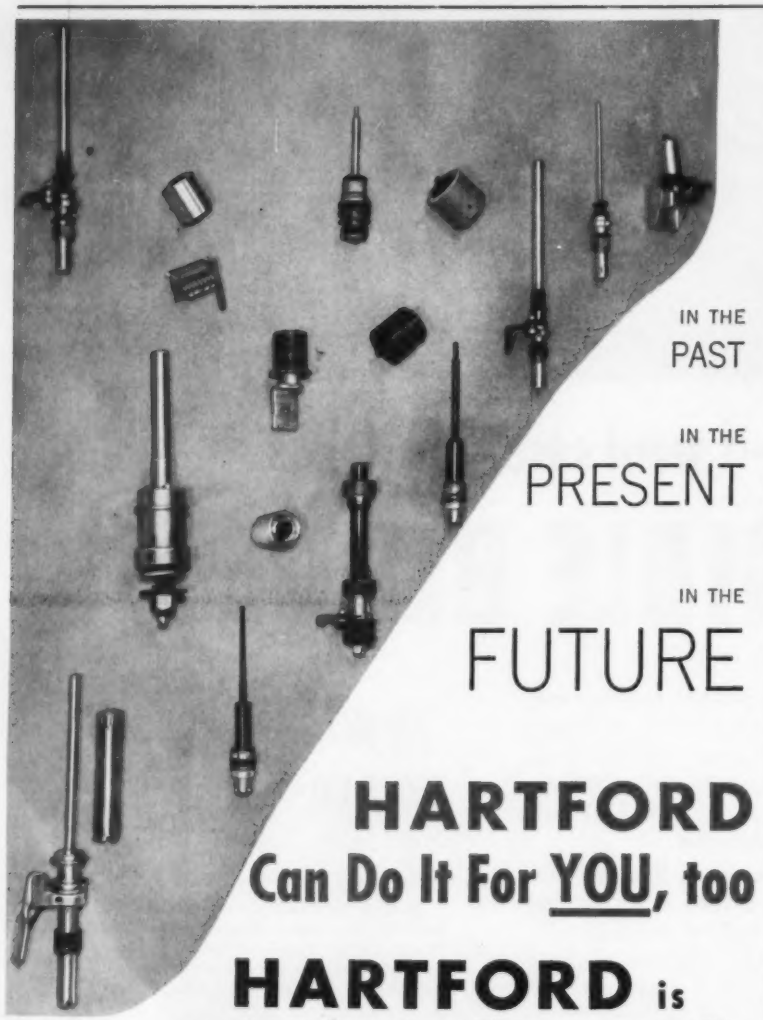
Edwin J. Yowell has been named to the new post of technical director of industrial sewing threads division of American & Efird Mills, Inc., at Mount Holly, N. C.

Dan River Mills, Inc., Danville, Va., has named **Ralph S. Hoisington** vice-president in charge of raw material procurement.

John Bell has assumed his new duties as production superintendent of Reeves Bros., Inc., at the Bishopville, S. C., Finishing Co. * * * **Cal Getgood** has been appointed dyeing superintendent and **James Parnell** has been named office manager succeeding **Paul Gillespie,** who was transferred to the New York office.

Fulton Cotton Mills, Atlanta, Ga., has announced the appointment of **L. O. Harris** to the textile sales staff in Chicago, Ill.

Continued on page 26



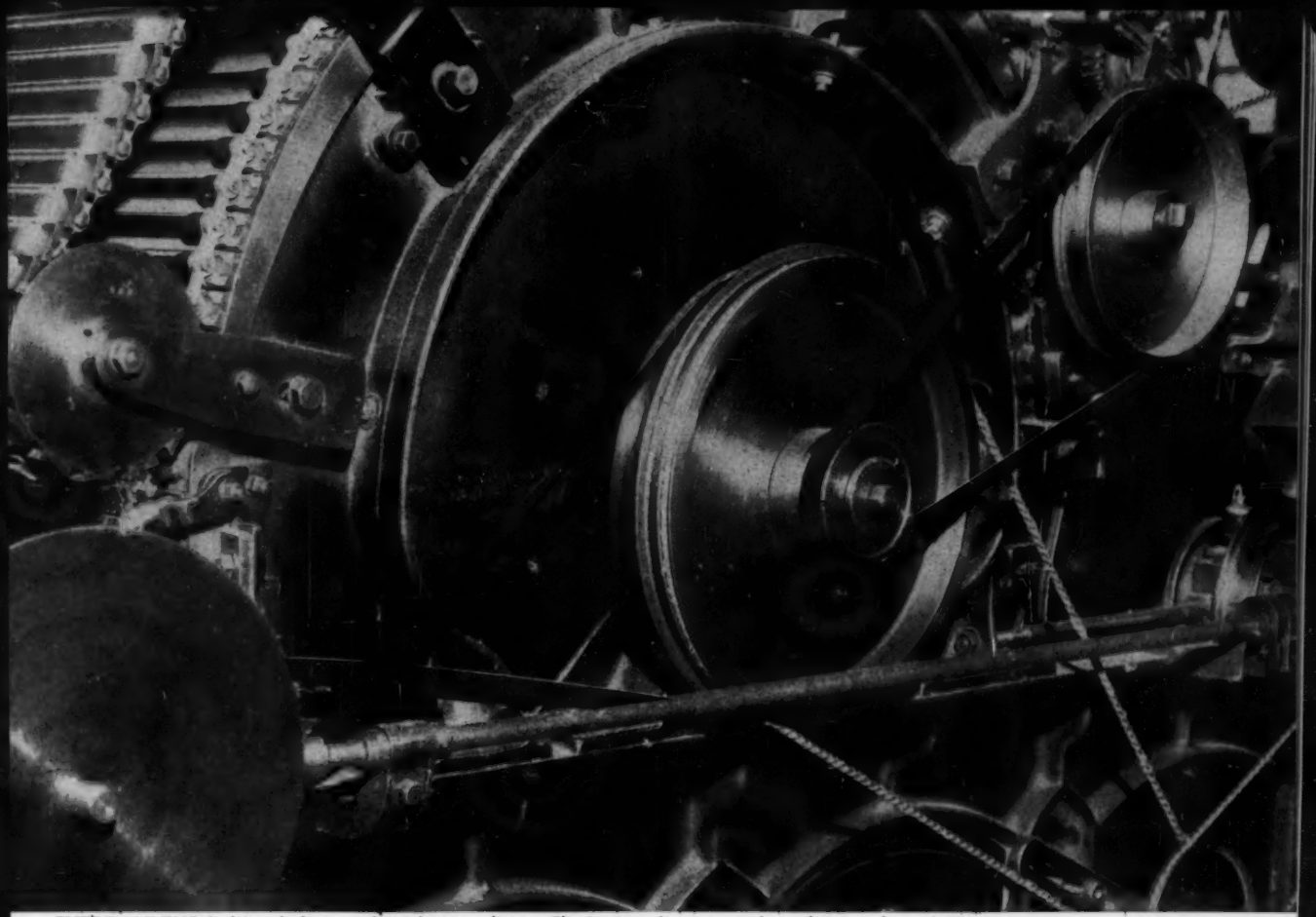
HARTFORD
Can Do It For YOU, too

HARTFORD is equipped to handle any spindle problem with "Job Adapted" Spindles and Parts. WHAT IS YOUR PROBLEM?

100% American Engineered, Manufactured and Serviced

HARTFORD-GREENVILLE DIVISION

STANDARD SCREW COMPANY BOX 1776 GREENVILLE, S.C.



EXTREMULTUS belting helps produce better sliver. Eliminates slipping and resulting web variation.

for increased textile mill efficiency

EXTREMULTUS

THE BELT THAT WON'T STRETCH . . . WON'T SLIP

THE BEST DRIVE AT THE LOWEST COST!

EXTREMULTUS is not merely a new name. It is a new *kind* of belt. It combines a polymer core — for strength and elasticity — with chrome tanned leather for high friction and flexibility. It is unique; it has never been successfully imitated.

EXTREMULTUS eliminates start-up problems; keeps tension; gives smooth, constant speed; splices quickly, reduces bearing loads — and outlasts all other belting.

EXTREMULTUS belts have been job-proven in hundreds of textile mills and in many other industries. Mills that have tried it are now converted to EXTREMULTUS 100%.

EXTREMULTUS, INC.

25-11 40th Avenue **Long Island City 1, N. Y.**

A

EXTREMULTUS, INC.

25-11 40th AVENUE
LONG ISLAND CITY 1, N. Y.

☐ Send me EXTREMULTUS catalog.
I would like more information on how EXTREMULTUS:

☐ Keeps tension
☐ Eliminates start-up problems
☐ Outlasts all other belting
☐ Gives smooth, constant speed
☐ Reduces bearing loads
☐ Splices quickly

NAME .....

TITLE .....

COMPANY .....

ADDRESS .....

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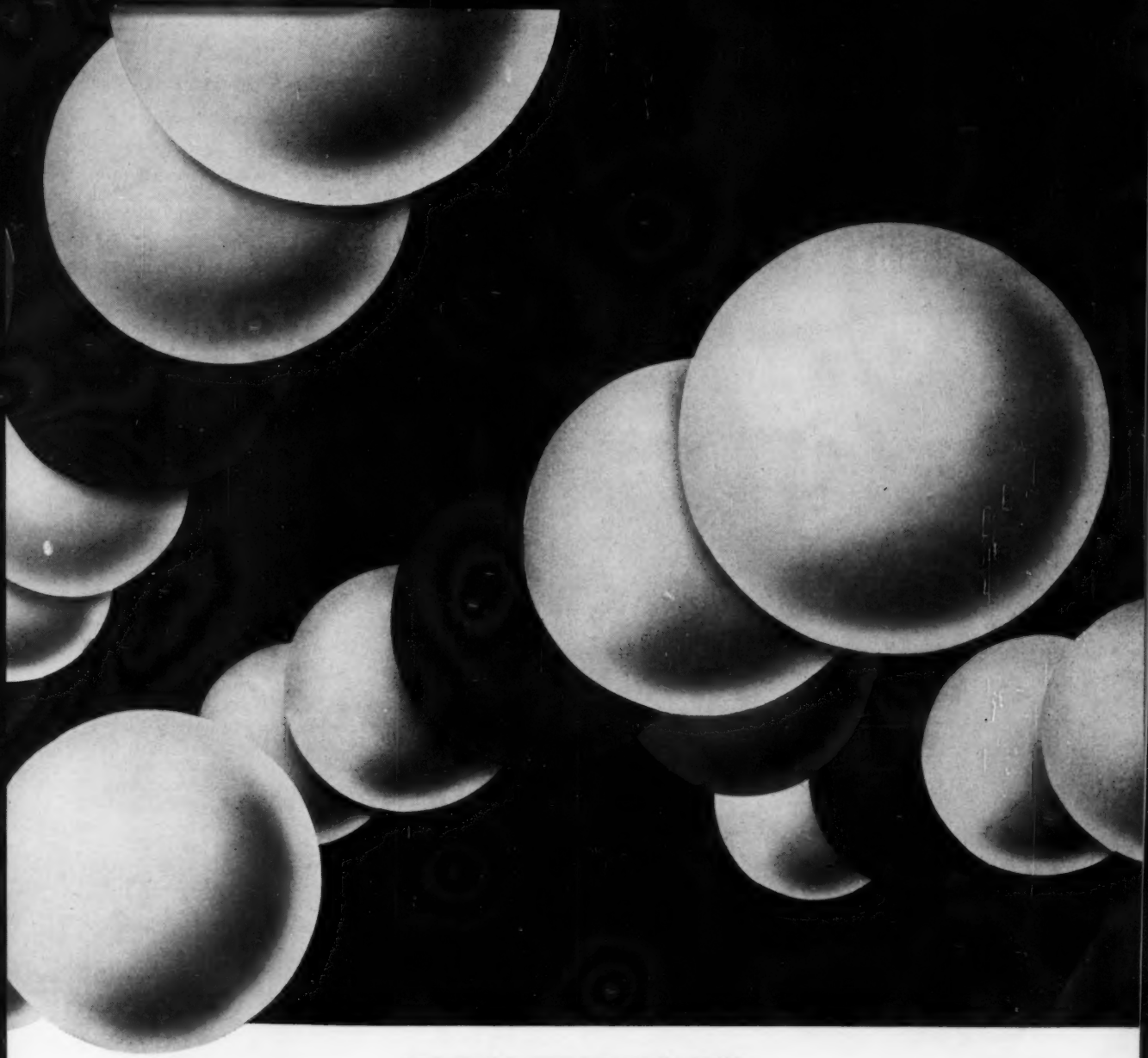
Chemical reactor (red) cross-links molecules having reactive groups (blue) to produce large molecular aggregate as shown in stylized diagram.

You get
EXTRAORDINARY
FASTNESS



WITH THE NEW
AQUAPRINT SUPRA COLORS AND REACTOR

Chemical cross-linkage is the reason. Unlike regular pigment printing colors and clears, the new Aquaprint Supra Colors and Clears are formulated with reactive binders. Under proper conditions of dry or wet heat, the reactor links together the molecules of the reactive binders into large molecular aggregates. Result: a tenacious, pigmented film is formed on the fibers that is highly resistant to water, detergent solutions, organic solvents, and mechanical abrasion.

Major Advantages

1. Extraordinary fastness to commercial laundering, repeated home washing, and both wet and dry crocking on a wide variety of fabrics made from cotton, linen, rayon, acetate, polyamide, polyester, acrylic, glass, and other fibers and blends.

2. Fabrics after printing and drying can be cured or aged in acid or neutral steam. Satisfactory fastness for many end uses obtained merely by can or tower drying.

3. Valuable for printing alongside conventional dyes and for printing textiles which will not withstand high curing temperatures.

For further information on the New Aquaprint Supra Colors, Clears and Aquaprint Reactor write or phone the Color & Chemicals Division office near you.

Aquaprint® SUPRA COLORS

Interchemical CORPORATION • *Color & Chemicals Division*

Pawtucket, R.I. • HAWTHORNE, N.J. • Rock Hill, S.C.

THE TEXTILE INDUSTRY *Banks on* BIJUR AUTOMATIC LUBRICATION

In hundreds of mills Bijur Automatic Lubrication is paying big dividends in increased production and lower operating costs.

With Bijur, a machine oils itself —while running. You profit from increased production on every machine. There are no stops for oiling and bearing failures are virtually eliminated.

When your machines are Bijur-equipped, even the most inaccessible bearings get the right amount of filtered oil at the right time.

Your operating costs are cut: oil spots on work are eliminated, personnel injuries are avoided, fire risk is reduced, oil consumption is cut greatly by accurate metering, and you enjoy better housekeeping.

Leading textile mills are banking on Bijur Automatic Lubrication. Let us show you how we can help you do the same.

BIJUR AUTOMATIC LUBRICATORS—STANDARD EQUIPMENT IN MANY INDUSTRIES
Textile Machinery • Machine Tools • Business Machines • Printing Machinery • Food Product Machines • Bottling Machines • Packaging Machines • Sheet Metal Machines • Plastic Fabricating Machinery • Glass Products Machinery • Wood-Working Machinery • Industrial Sewing Machines • Special Process Equipment

2369 A

Colorful, new bulletin, "From Fibre to Fabric," shows the practical benefits that Bijur Automatic Lubrication offers to the Textile Industry. Write for your copy.

BIJUR LUBRICATING CORPORATION
Rochelle Park, New Jersey
Pioneers in Automatic Lubrication

PERSONAL NOTES

(from page 22)

William D. Windsor, formerly foreman of the carding department has been promoted to assistant superintendent of the Pell City, Ala., plant of Avondale Mills, while **Claude D. Sawyer** has assumed his new duties as foreman of carding there.

Mr. Windsor
Pell City

Mr. Sawyer
Pell City

Donald C. Johnston has been appointed general manager of the northern group of the woolen and worsted division of J. P. Stevens & Co., Inc., succeeding **Walter L. Goddard** who has retired. * * * **Charles B. Adams** has been named director of purchasing of synthetic yarns and fibers. * * * **James A. Lybrand, Jr.,** vice-president, has retired after having spent 48 years in the textile field.

Paul M. Felker, Jr., has become quality control manager of the three Georgia plants of The William Carter Co.

Mr. Felker

Campbell Sanders, formerly on the staff of the *Cincinnati* (Ohio) *Enquirer,* has assumed his duties as the South Carolina public relations representative of the American Cotton Manufacturers Institute.

Berkshire Hathaway, Inc., Providence, R. I., has appointed **Edmund Rigby** executive vice-president and **John K. Stanton** has been designated vice-president in charge of administration for the company.

Continued on page 30

HUNDREDS OF NEW PRODUCTS
from RANDO-WEB® NONWOVENS
mean BIGGER PROFITS for YOU

Dress materials, drapes, fabrics, ties, disposable cloths, filters, shoe liners, rug backings, seed planters, chamois cloths, greeting cards, reinforcement for plastics, abrasive wheels and hundreds of other profitable products are being made with nonwoven materials from RANDO-WEB(S)®.

There is a RANDO-FEEDER® and RANDO-WEBBER® to fit most requirements in 40", 60" and 84" widths. There are no other machines in the world that can make uniform random webs like them.

The Curlator FIBR-SAVR, now available for these machines, gives added economy to the manufacture of nonwovens. It trims one or both sides of web or multiple slitting in any desired strip width and returns the trimmed (unbonded) fiber to the feeder for reprocessing.

It will pay you to see webs made with natural or synthetic fibers or blends on the RANDO-FEEDER and RANDO-WEBBER.

Call or write us today for demonstration or Bulletin No. 105.

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Parrott & Ballentine, 3440 Augusta Rd.
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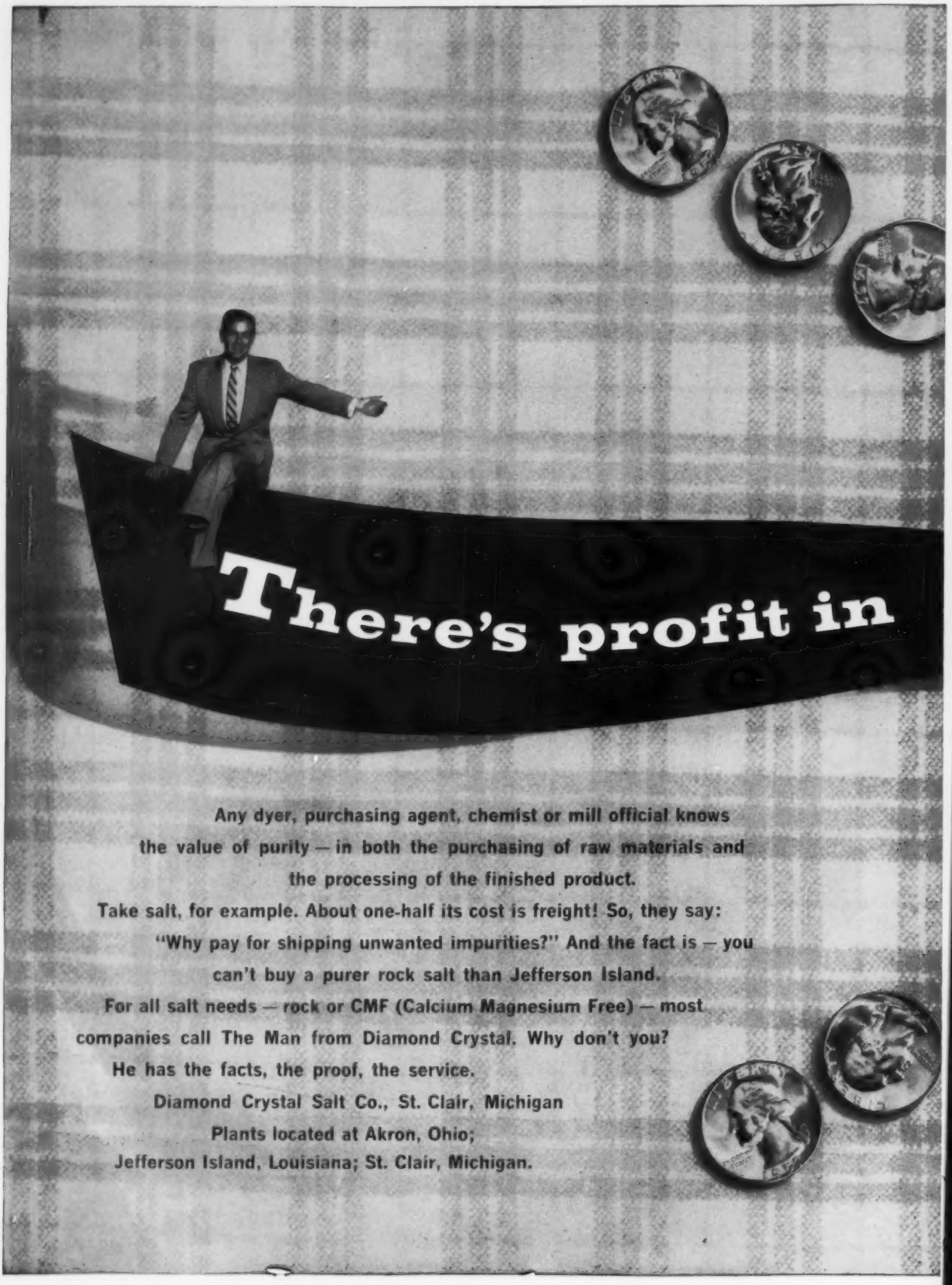
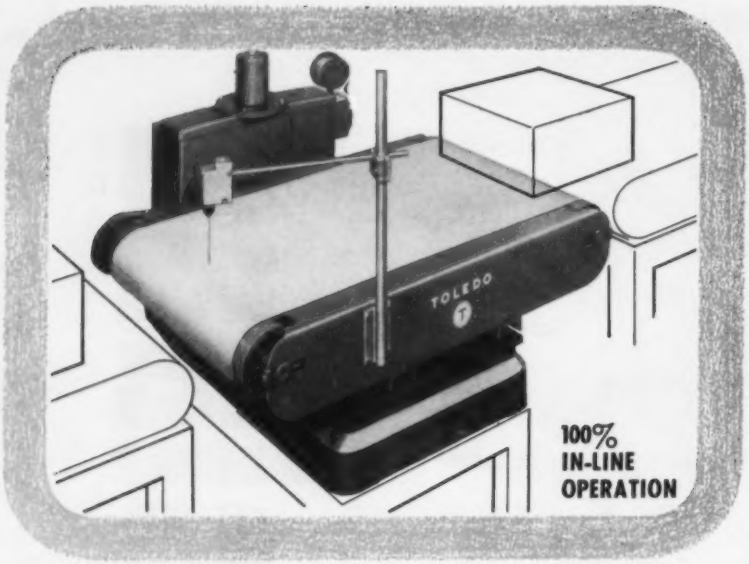
535 Fifth Ave., New York 17, N. Y.

TEXTILE DIVISION
CURLATOR®
CORPORATION
EAST ROCHESTER, NEW YORK


There's profit in
Any dyer, purchasing agent, chemist or mill official knows
the value of purity — in both the purchasing of raw materials and
the processing of the finished product.
Take salt, for example. About one-half its cost is freight! So, they say:
"Why pay for shipping unwanted impurities?" And the fact is — you
can't buy a purer rock salt than Jefferson Island.
For all salt needs — rock or CMF (Calcium Magnesium Free) — most
companies call The Man from Diamond Crystal. Why don't you?
He has the facts, the proof, the service.
Diamond Crystal Salt Co., St. Clair, Michigan
Plants located at Akron, Ohio;
Jefferson Island, Louisiana; St. Clair, Michigan.

Jefferson Island DIV.

DIAMOND CRYSTAL SALT CO.



FAST, AUTOMATIC, IN-MOTION

CHECKWEIGHING

WITH NEW TOLEDOS

MODEL 9460
Items 50 to 200 Lbs., to 40 per min.

MODEL 9463
Items 5 to 50 Lbs., to 40 per min.

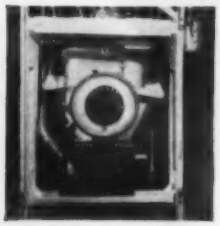
Get 100% in-line checkweighing with these new Toledos! Checkweigh bags, cartons, packages, parts and pieces automatically. You'll save time, labor and material . . . keep weights consistent . . . build customer goodwill.

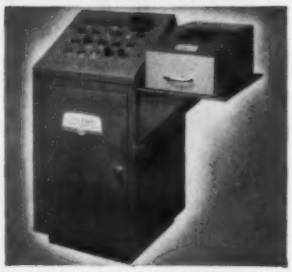
Designed with continuous-running motorized conveyor on the weigh section, these Checkweighers fit readily into conveyor lines . . . are accurate to one part in 3,000. Available with remote zone indication stations for continuous visual check, magnetic counters to accumulate operating data, and other advanced Toledo features.

Now is the time to check into Toledo Checkweighers for your operations! Send for Bulletin 2968. TOLEDO SCALE, Division of Toledo Scale Corporation, Toledo 12, Ohio.

Toledo Automatic Bulk Weighing . . . net weight listing and totaling

Get accurate net weight listing and totaling of bulk materials going into truck or carload shipments. Weighing is automatic. You save time, control costs and reduce claims. The Toledo control console which interlocks all elements of the system, may be remotely located for operating convenience. Ask for Bulletin 2490.





SERVICE Factory-Trained 200 Cities

TOLEDO®

Headquarters for Weighing Systems

PERSONAL NOTES

(from page 26)

The Central Manufacturing division of M. Lowenstein and Sons, Inc., has announced the promotion of **Robert G. Sharpe** to manager of the Spofford Mills plant in Wilmington, N. C.

The Schwarzenbach Huber Co., has announced the appointment of **Michael Kopec** as vice-president in charge of the Luray, Va., division.

Dr. Fred Stilson Perkerson, formerly chief of the cotton chemical laboratory of the Southern Utilization Research and Development division of the Department of Agriculture, has joined Cone Mills Corp. as manager of the company's central laboratory and testing.

OBITUARIES

Joseph H. Beebe, 57, plant superintendent of the Lacon (Ill.) Woolen Mills.

William E. H. Bell, 73, president of Klauder Weldon Giles Machine Co.

Howard R. Cook, 65, Atlanta, Ga., president of the Atlanta Brush Co.

I. Fletcher Craven, 86, president and treasurer of Columbia Manufacturing Co., Ramseur, N. C.

John S. Crow, 74, Greenwood, S. C., retired superintendent of Belton Mills.

Harold V. Farnsworth, 64, Winchester, Mass., vice-president and director of Atkinson Haserick & Co., Inc.

Ernest A. Feustel, 66, president of Ernest A. Feustel, Inc.

Major Ernest Geer, 88, textile executive, Douglasville, Ga.

H. T. Goss, retired superintendent of the Durham (N. C.) Hosiery Mills.

James Rutledge Henderson, 62, Charlotte, N. C., vice-president and director of Parks Cramer Co.

William L. Hyman, 71, owner of Hyman Hosiery Mills, Ephrata, Pa.

B. A. Joslin, 50, Bal Harbour, Fla., retired executive of M. Lowenstein & Sons, Inc.

Milton S. Kingson, 55, president of Millburn Mills, Inc., and Bryant Finishing Co.

Vivian C. McCollom, 57, Ridgewood, N. J., president of Allentown Converting Works.

Sol Shapiro, 60, president, Summit Manufacturing Co., Merion, Pa.

John G. Stewart, formerly president of Vernon Textile Co.

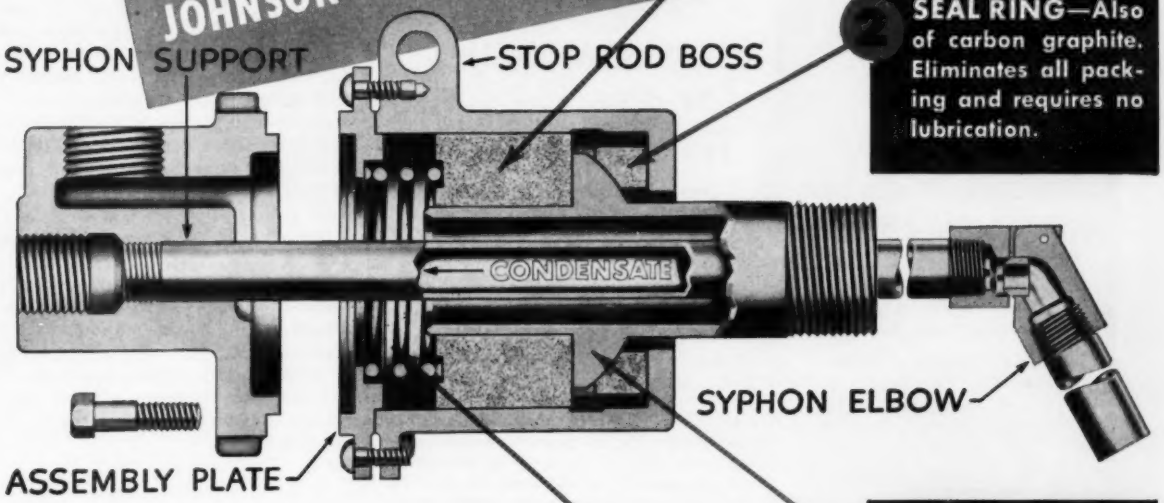
Paul Whitin, 82, retired chairman of the board of Paul Whitin Manufacturing Co.

George Veghte, 94, Johnstown, N. Y., president of the Diana Knitting Co.

Only 4 INTERNAL PARTS

This is the one to use... { For 23" dia. Dry Cans and 30" dia. Slasher Cylinders

TYPE SB2-P JOHNSON JOINT and JOHNSON SYPHON ELBOW



1 GUIDE—Makes the joint self-supporting. It is of self-lubricating, long-wearing carbon-graphite.

2 SEAL RING—Also of carbon graphite. Eliminates all packing and requires no lubrication.

3 NIPPLE—Rotates with the roll, and seals against the ring.

4 SPRING—Serves for initial seating only. In operation joint is pressure sealed.

Notice how straightforward and simple is the design of this Johnson Joint. This unmatched simplicity means fewer breeding places for trouble... simplifies overhaul and repair out in the field. At the same time the joint is completely packless, self-adjusting, self-lubricating and self-supporting.

In this Series 3000 Type SB2-P the assembly plate holds the internal parts in position when head is removed. This makes it a perfect teammate for the Johnson Syphon Elbow which can be inserted or withdrawn right through the joint.

Test it yourself—We'll gladly supply a pair of the units shown for 90 day trial right in your own mill; no obligation of course. Write for details and literature.

Products of The **Johnson Corporation**

815 WOOD ST., THREE RIVERS, MICH.

Rotary Pressure Joints • Compressed Air Separators and Aftercoolers
Direct Operated Solenoid Valves • "Instant" Steam Water Heaters

USP PALLETAINERS

Typical of the custom-built Textile Palletainers, these units are equipped with half-side, drop-gate for easy accessibility to contents and caster mounted for easy floor maneuverability.

Another interesting example is this (26"x38"x32") unit—selected by several plants as the best "standard" size for general floor operations.

NOW

CUSTOM-BUILT for the TEXTILE INDUSTRY

Lightweight Sizes and Types to Meet All Needs for Processing, Storage, Interplant Transport and Shipping

Special Snag-Proof Finishes Over Steel Mesh

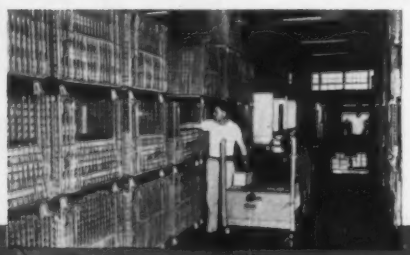
Safe Stacking . . . Fold-Down and Castered Models

TEXTILE PALLETAINER Applications are Unlimited!

- Contents always visible—always protected
- Stack safely—save floor space
- Higher Capacities—less tare weight
- Smooth, sturdy steel mesh—special plastic, lacquer or paint finishes
- Drop sides, ends or gates—accessibility
- Reinforced deck base—safe lift truck handling
- Fold-down features for freight savings

USP Palletainers are available in pre-engineered, custom-built models to meet Textile Industry application requirements.

Textile Palletainers offer modern container advantages plus unit-handling methods, safety, special protective finishes—and the simplicity of space-saving storage or rapid movement and shipment of unitized loads. Textile Palletainers are rapidly revolutionizing handling methods for in-work storage of cones, springs, quiller bobbins—even delicate yarns. Palletainers, with protective liners, have proven invaluable for threads through all stages of wet and dry finishing, storage and shipment.



This plant saves valuable floor space by stacking their Textile Palletainers during processing and storage operations.

Write Today... for complete information and prices on USP Textile Palletainers to meet your need.

Regular Heavy Duty Hi-Lode Palletainers are immediately available in a

PALLETAINERS ARE MANUFACTURED EXCLUSIVELY BY:

UNION STEEL PRODUCTS CO.

630 N. BERRIEN ST. ALBION, MICHIGAN

Manufacturing plants also in Compton, Calif. and Waterloo, Quebec, Canada

MILL NOTES

The Pee Dee Mill No. 2, Rockingham, N. C., has been purchased by **J. P. Stevens & Co., Inc.** The mill will be used for storage of machinery and raw materials according to a company spokesman. *** Buresh Nonwovens, Inc., Westfield, Mass., a subsidiary of Ames Textile Corp., has been purchased by J. P. Stevens & Co., Inc. *** The $2 million expansion program at the Utica Mohawk plant near Clemson, S. C., will consist of additions to the main plant for slasher, cloth room, additional finishing and looms with necessary complementary equipment. It also includes the installation of a new 110,000 pound per hour boiler with a new boiler house.

Grey mill employees of **Riegel Textile Corp.**, Trion, Ga., attended a barbecue dinner recently honoring their achievement in working 5,000,000 man hours without a lost time accident. * * * Upon completion of installation in Weave Room No. 4, all the weave rooms at the Ware Shoals (S. C.) division have been air-conditioned.

E. I. du Pont de Nemours & Co. (Inc.) has licensed three additional mills to produce carpets of Du Pont 501 carpet nylon. Mills which will produce carpeting of the continuous filament nylon are **Bigelow-Sanford Carpet Company, Inc., Cabin Crafts Inc.,** and **Callaway Mills, Inc.**

A new firm, **The Cartersville** (Ga.) **Dyeing and Finishing, Inc.,** has been chartered to conduct business of commission scouring and dyeing of wool and other textile fibers, and will install machinery for piece dyeing for the textile industry.

A newly chartered company, **American Craft Co.,** Monroe, N. C., has begun production of tufted bedspreads and associated lines. Thomas L. Durgin is president.

Singer Hosiery Mills, formerly operated in High Point, N. C., has begun production of men's and ladies' hosiery in the new plant in Thomas-

Continued on page 50

REMAZOL

VINYL SULFON FIBER REACTIVE DYESTUFFS

- Exclusively suitable for white and vat colored discharges
- Can be **washed clean** at very high speeds
- Can be supplemented with dischargeable Hoechst Naphtol specialties
- Can be used for other fibers—wool, silk, nylon, Acrilan* and Creslan®

developed and patented by
FARBWERKE HOECHST AG.
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manufactured by
HOECHST CHEMICAL CORP.
West Warwick, R. I.

HOECHST

CARBIC-HOECHST CORPORATION
451 WASHINGTON STREET, NEW YORK 13, N. Y.
CHARLOTTE • LOS ANGELES • PHILADELPHIA • WEST WARWICK, R. I.

*® *Acrylic fiber by Chemstrand*

Ideal's Trade-In Allowance

Applies to Completely New Frames or Rebuilt Drawing Frames

Take your choice. Either way you save substantially. Either way you get drawing frames with the famous Feathertouch action which are equal in appearance, performance, production, efficiency, and quality **to any completely new drawing on the market.**

Rebuilt frames can be furnished in either 16" or 18" gauge four delivery frames. Every working part above the can table is new. These are factory rebuilt . . . not mill changeovers. The complete frames are delivered to your mill ready to set in place and run.

These are the only parts of the original frames which are used in the rebuilt frames and they are completely reconditioned and refinished. You get the complete IDEAL Frames as shown in large circle, ready to run upon arrival at your mill.

Standard or Optional Features

Individual Vacuumatic Cleaning
Individual Motors
Individual Drives
Electro-Magnetic Clutch
Electric Knock-Off Actions
Ball Bearing Spacing Sections
No Shafting, Flat Pulleys, or Belts
The Famous Feathertouch Action
—produces highest quality sliver—at over 400 ft. per min.
Frames can be operated singly or in multiples

The Originators of High Speed Drawing

Ideal Industries, Inc.
Bessemer City, N. C.

WESTVACO® CUTS

OUT OF THE MAP

to give caustic users faster service!

CAUSTIC SODA
Liquid 73%;
Liquid 50%, Regular and Low-Chloride Grades;
Flake, Solid and Ground.

CAUSTIC POTASH
45% and 50% Liquid;
Flake.

When it comes to deciding which supplier will give you consistently fast service one thing is certain: you've got to forget "as-the-crow-flies" geography and consider the actualities of railroad routing, interchanges and layovers.

If you make such an analysis, chances are, like many alkali buyers in the East, mid-South and Midwest, you'll see the wisdom of placing a good share of your business with Westvaco. Our strategic location at South Charleston, W. Va., often enables us to be in your plant faster than producers who are closer on the map.

If you want to know what we can do for you, call our nearest office today. We'll be happy to quote prices and *delivery time* right to your plant.

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FOOD MACHINERY AND CHEMICAL CORPORATION

Putting Ideas to Work

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Westvaco Chlor-Alkali Division
General Sales Offices:
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SCHOLLER INTRODUCES AN AMAZING GROUP OF NEW, DURABLE SOFTENERS...

The Creamoyls

The result of more than two years of development and application on millions of yards of fabrics and all fibers...a group of finishes that imparts a wide variety of desirable properties with an ease of application that demands nothing more than required in the usual pad or exhaust methods...

The CREAMOYLS present variations of the same basic finish, each designed to do the very best possible job on each specific fiber and fabric requirement.

The CREAMOYLS are durable finishes that impart a fabulous loft and fullness of hand, a high degree of controlled softening without "ragginess", a fine surface lubricity and excellent anti-static qualities.

Manufacturers will discover many additional advantages in CREAMOYL-finished fabrics: better cutting, more efficient sewing, will not discolor white-goods on prolonged storage, and increases wash-fastness of many dyestuffs.

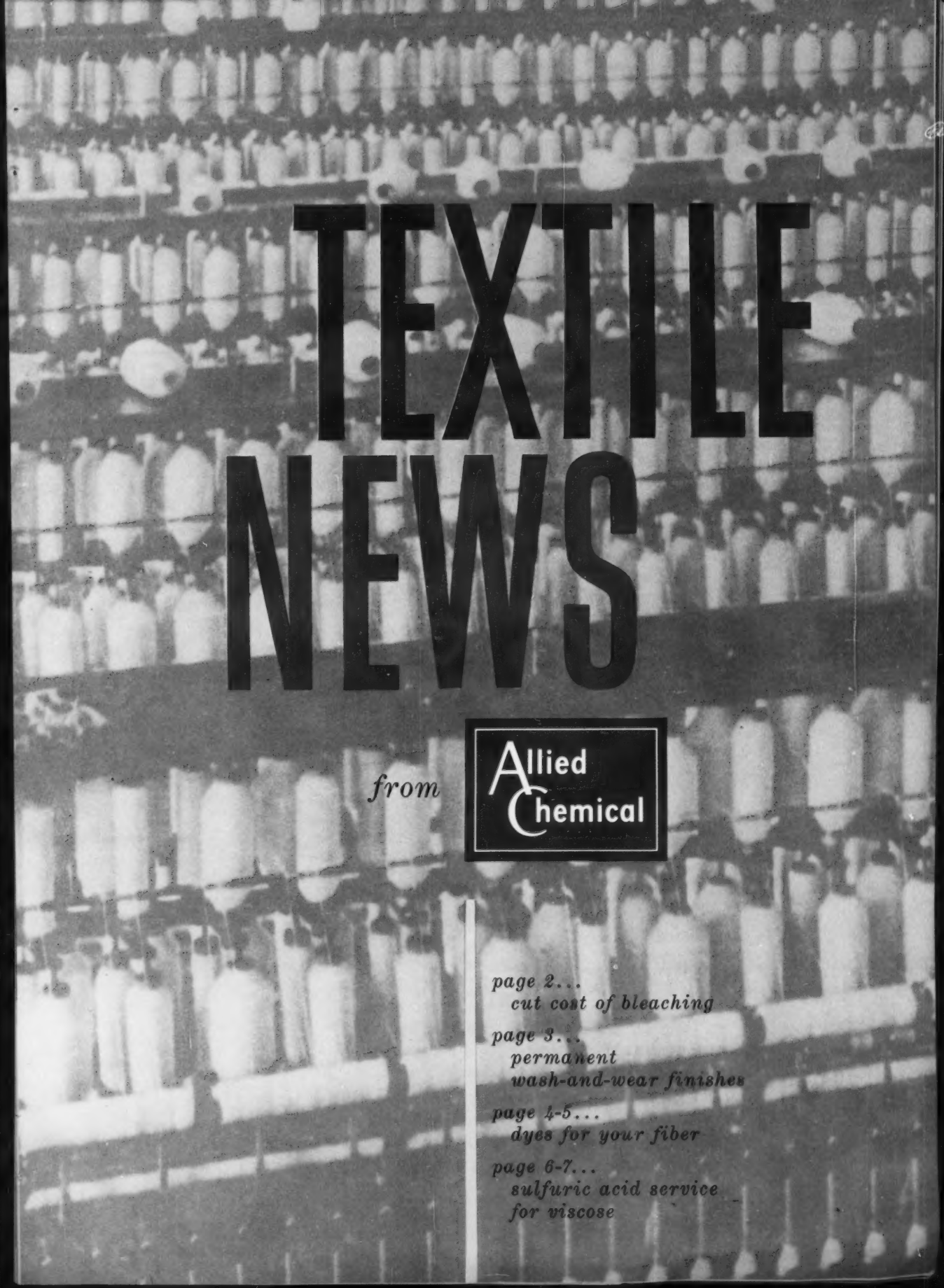
The CREAMOYLS are available as modified cationic, anionic, nonionic, and amphoteric systems and particularly recommended for enhanced finish on piece goods, knit goods, sweaters of wool or synthetic fibers, socks, anklets and leotards, non-woven fabrics, stretch yarns and fabrics.

Test samples are available on request. Please specify the fabric and fiber on which the finish is to be applied so that the proper, recommended CREAMOYL may be forwarded.

Scholler BROTHERS, INC.

PIONEERS IN THE BETTER FINISHES THAT MAKE THE BETTER FABRICS; SINCE 1907

Collins & Westmoreland Sts., Philadelphia 34, Penna. IN CANADA: Scholler Brothers, Ltd., St. Catherines, Ontario



TEXTILE NEWS

from Allied Chemical

page 2...
cut cost of bleaching

page 3...
permanent wash-and-wear finishes

page 4-5...
dyes for your fiber

page 6-7...
sulfuric acid service for viscose

• *new process cuts cost of bleaching chemicals up to 50%*

Now you can save up to 50% of the cost of cotton bleaching chemicals. Solvay's Activated Hydrogen Peroxide Bleaching Process not only helps you realize substantial savings of chemicals, but actually improves the quality of the cloth at the same time. You obtain increased purity and higher whiteness, as well as lower color reversion and ash content. Send for brochure giving complete process details. ■ **SOLVAY PROCESS DIVISION**

• *now...*

permanent

wash-and-wear

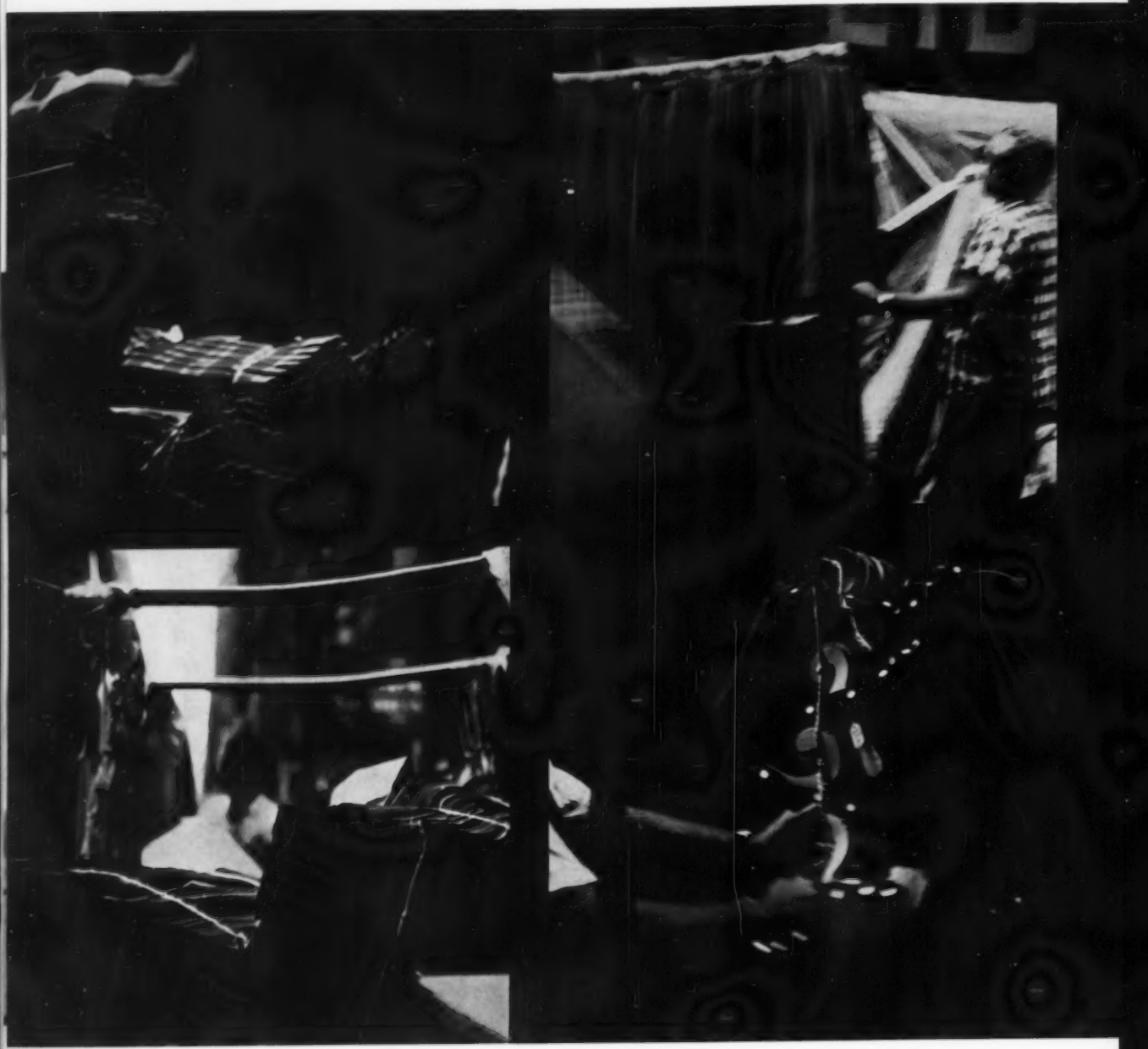
finishes

with above-normal

tear strength

What can be done about loss of tear strength caused by some wash-and-wear finishing resins? Incorporate A-C Polyethylene! This new emulsifiable polyethylene from Semet-Solvay Petrochemical Division overcomes the loss, increases tear strength to above-normal. Other benefits: better crease resistance, whiter whites, scorch resistance and superb "hand." Our brochure, "Emulsifiable A-C Polyethylene for Textiles," gives the whole story. ■ **SEMET-SOLVAY PETROCHEMICAL DIVISION**

• *almost 1,000 dyes for all major textile fibers*



NATIONAL AND CARBANTHRENE are Allied Chemical trademarks

Pick almost any fiber – you can color it with a NATIONAL dye. National Aniline makes nearly 1,000 different types of dyes for every fiber generally used in textiles. Vat dyes, for example. There's no specking with CARBANTHRENE vat dyes, because they're redispersible if they dry out. Their fine particle size also means uniform package or beam dyeing, from inside to outside. After 80 years of dye making, National Aniline still offers the broadest line of quality dyes.

■ NATIONAL ANILINE DIVISION

ANACORTES WORKS
Anacortes, Washington

BATON ROUGE WORKS
Baton Rouge, Louisiana

BAY POINT WORKS
Port Chicago (San Francisco), Calif.

BRITISH COLUMBIA WORKS*
Barnet, British Columbia

BUFFALO WORKS
Buffalo, New York

CALUMET WORKS
Hegewisch (Chicago), Illinois

DELAWARE WORKS
North Claymont, Delaware

DENVER WORKS
Denver, Colorado

DETROIT WORKS
River Rouge, Michigan

• *sulfuric acid for viscose rayon...*
wherever you need it...whenever you need it

EAST ST. LOUIS WORKS
East St. Louis, Illinois

ELIZABETH WORKS
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NATIONAL WORKS
Cleveland, Ohio

NEWELL WORKS
Newell, Pennsylvania

NITRO WORKS
Nitro, West Virginia

PAINESVILLE WORKS
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RICHMOND WORKS
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SULPHIDE WORKS*
Sulphide, Ontario

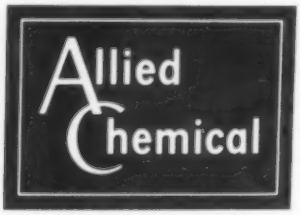
VALLEYFIELD WORKS*
Valleyfield, Quebec

*In Canada: ALLIED CHEMICAL CANADA, LTD.

No one knows better than the viscose rayon manufacturer how vital a dependable source of sulfuric acid is in maintaining uninterrupted production. With this need in mind, General Chemical has established a nationwide network of 21 plants as well as warehouses. Strategically located and geared to meet regional requirements, they can service your needs quickly and dependably. Write for your copy of General's full-color Sulfuric Acid brochure.

■ **GENERAL CHEMICAL DIVISION**

• *basic to America's progress*



For more information, write
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61 Broadway, New York 6, New York.

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• *principal products for the textile industry*

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with Butterworth Machines

Butterworth builds synthetic fiber processing machines to customer specifications:

- Synthetic fiber spinning and processing equipment, including the world-famous Butterworth Pot Spinning Machine.
- Wet finishing ranges — washers, padders, tenter dryers, cylinder dryers.
- Printing and embossing machines.

Butterworth Machines are engineered to meet your requirements, and backed by a strong, service-minded organization. It pays to put Butterworth in your machinery plans.

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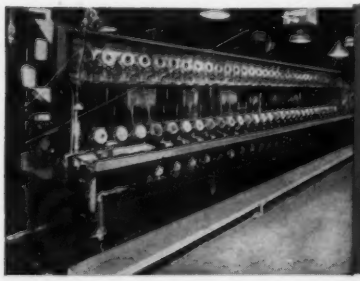
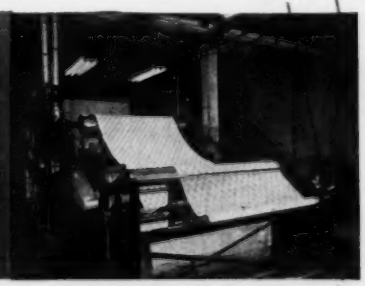
Butterworth Pot Spinning Machine



Butterworth Tenter Drying Range

Butterworth Embossing Machine



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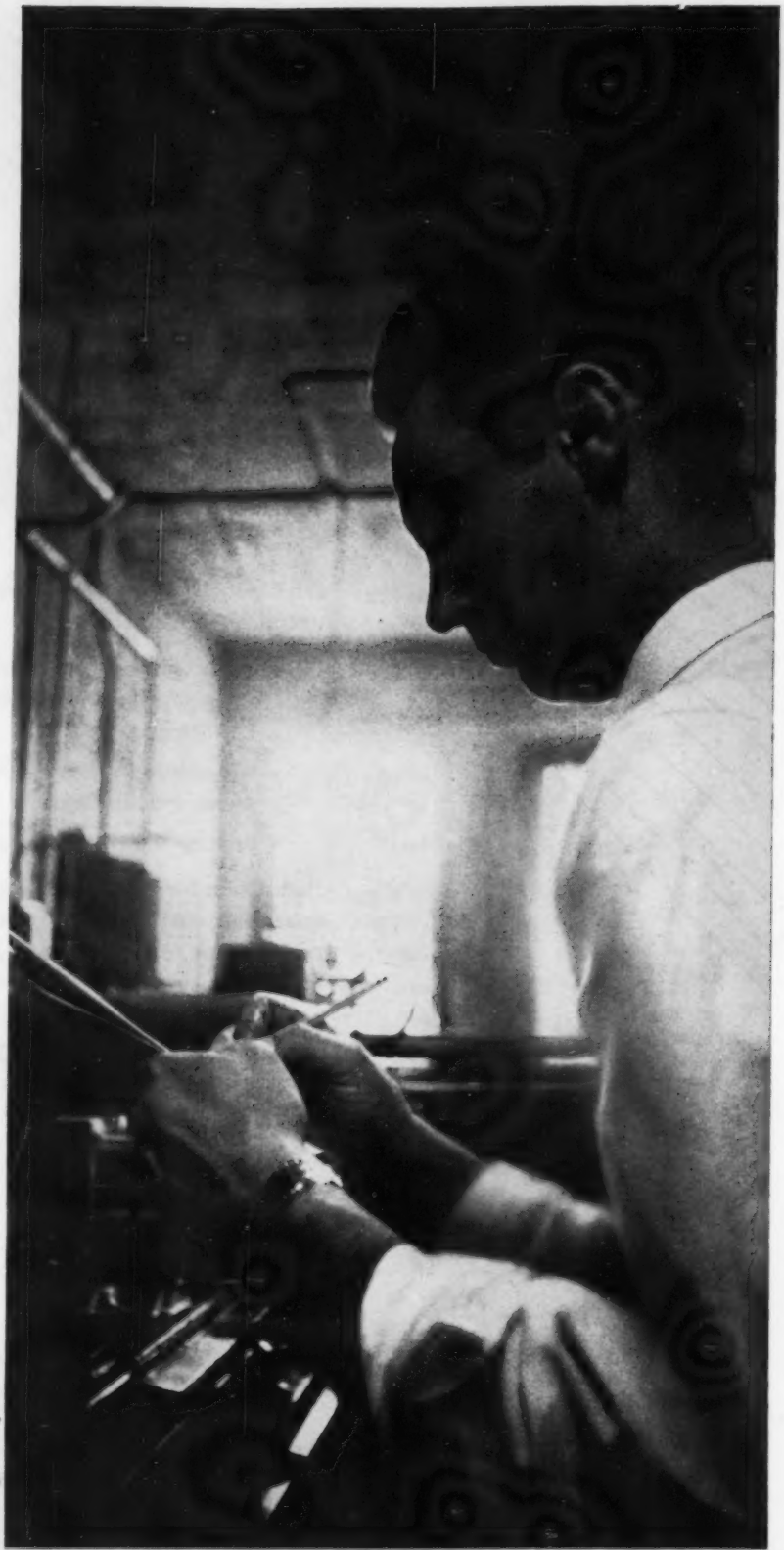
The Esso Lubrication Engineer brings to your shop the vast experience and facilities of Esso laboratories and research—as a customer service.

He offers, with a broad knowledge of fuels and lubricants, considerable experience in the maintenance of equipment like yours. For instance, he can trouble-shoot cases of rapid wear and frequent overhauls... point out instances where too much lubrication is wasteful... where too little—or the wrong kind—results in unnecessary wear. And if you have an unusual problem, he can have it analyzed in one of the conveniently located Esso Sales Service Laboratories—capable of running over 500 different kinds of petroleum product tests.

Let an Esso Lubrication Engineer help *you* cut maintenance costs. For more information, contact your nearest Esso office, or write to: Esso Standard Oil Company, 15 West 51st Street, New York 19, N.Y.



Esso

In industry after industry..."ESSO RESEARCH works wonders with oil"

YARMOR PINE OIL—LEADING WETTING AGENT FOR TEXTILES

The value of pine oil in wet-processing as a penetrant and wetting agent is long established. However, perhaps you're not acquainted with the particular advantages of Yarmor 302W, a Hercules pine oil made specifically for the textile industry. Yarmor reagent is not just "pine oil"; it is specially processed to produce an extra high-grade product with the greatest wetting, penetrating and emulsifying ability. That's why so many people in the textile industry never just say "pine oil." They say Yarmor®.

Pine Chemicals Division
Naval Stores Department

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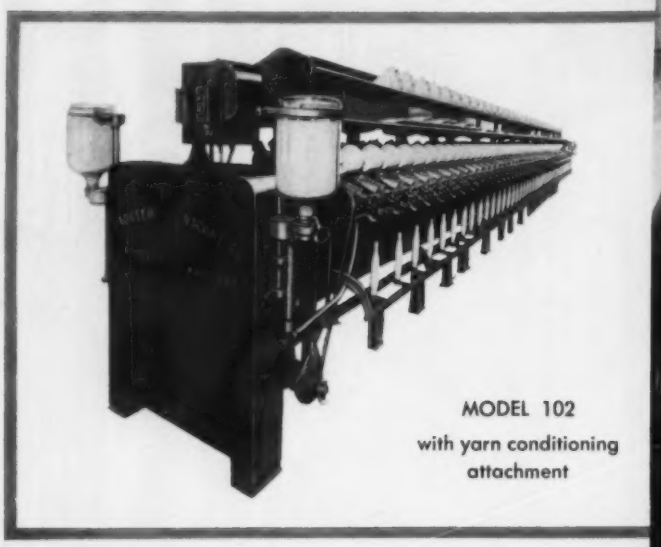
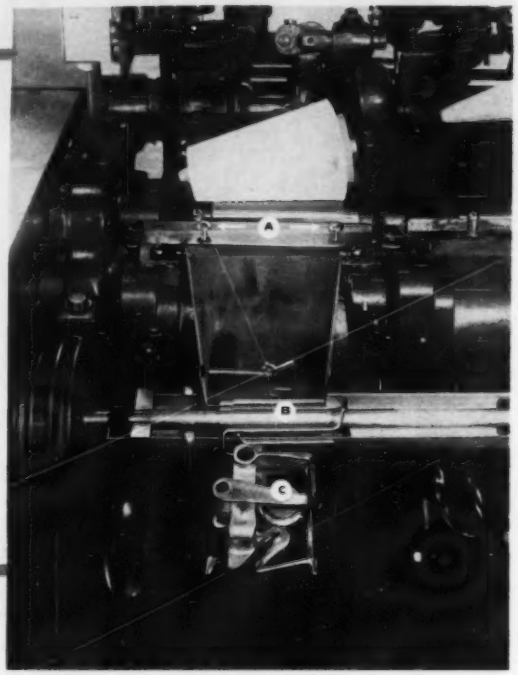
NY59-1

FOSTER MODEL 102

. . . For Backwinding Bulk, Stretch and Texturized Yarns



MODEL 102
with yarn conditioning attachment

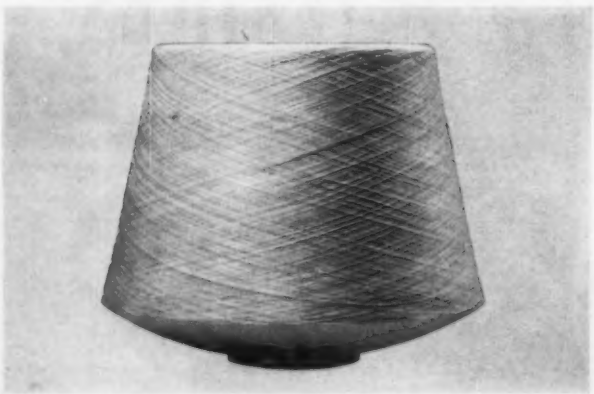


Mushroom buttons (A), moistening attachment (B) and tension attachment (C) on Model 102.

An Outstanding Example of This Machine's

FLEXIBILITY

For many years the Foster Model 102 has been widely accepted for the winding of all types and counts of spun yarns, because of its flexibility, or adaptability, including adjustable angle of wind and adjustable taper. Once again this reputation is confirmed by the machine's recent economical adaptation to the winding of bulk, stretch and texturized yarns.



142-9 Cone of Textralized® yarn wound on Model 102.

In addition to flexibility the Model 102 offers the following: —

QUALITY CONES. The increased taper reduces yarn drag and equalizes tension at all cone diameters. The convex base prevents "nipitis". Highly efficient slub catchers automatically inspect yarn. Ribbon breaker prevents ribbon wind. Idler shell on winding drum prevents chafing of yarn.

ECONOMY. Doubles production and reduces operating costs ⅓, as compared with obsolete machines, due to high speed, self threading tension device, easy donning and doffing and empty bobbin conveyor discharging into standard size truck. Repair costs as low as $10.00 per year per 100 spindles. Simple adjustments which any competent fixer can make.

Bulletin A-95-A on request

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High Purity
Uniform Purity
Dependable Deliveries
Helpful Technical Service...
have made STAUFFER'S reputation
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STAUFFER'S CARBON DISULFIDE

exceeds 99.99% purity. Stauffer was the first—is still the largest—domestic producer of this essential chemical.

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(Sodium Hydrosulfide) is shipped in lined cars in aqueous solution of highest purity, 45% NaHS, suspended iron under 5 ppm. Cost is less per unit of 100%-active NaHS. The liquid is much easier to handle than the flake and pH is more accurately controlled. Send for new Technical Bulletin.

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is available in 50% and 73% liquid Rayon grade. New brochure, 30 pages with many graphs and tables will be sent on request.

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is tailor-made for your process—**to a tenth of one percent**—in strengths from 77.67% to 100%; also as Oleum of 15% free SO_3 to 100% liquid SO_3. Shipments from many points in the South, Midwest and West.

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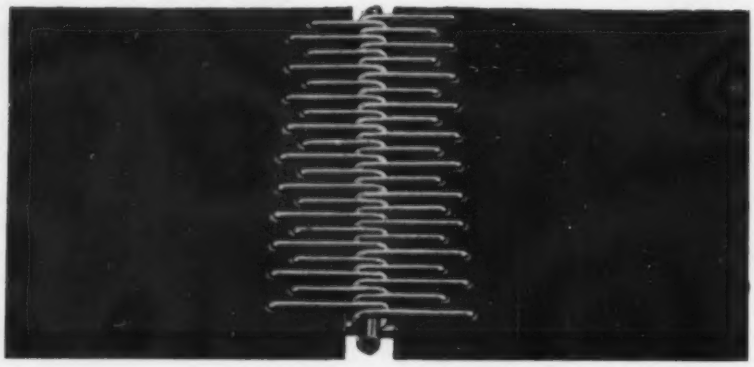
Ask for Technical Service if we can be of help to you. Stauffer's technical experts are skilled and experienced in every aspect of making and using these textile chemicals.

PULL LOOSE ENDS TOGETHER WITH CLIPPER Hooks and Lacers



Time is money . . . and you can save time in joining two loose ends with Clipper Hooks and Lacers. They produce secure, smooth joints in minutes embedding hooks flush with the surfaces of pieces joined. When fastening belts, aprons, or ribbons, they provide a flat, flexible joint that rides freely over conveyor rollers. When joining plastics and other rigid materials they produce a firm "hinge" that is as strong as the material itself. In either case, pieces up to 12 inches wide and 13/32 inches thick are laced in one easy operation. So whenever you have a problem that calls for making two pieces one — check with Clipper.

For more information— *Detailed product information and case history examples of Clipper machine-lacing benefits are contained in Bulletin No. 157. Send for your free copy today.*

Ask your Industrial Distributor for Clipper Products

Clipper BELT LACER COMPANY

980 Front Ave., N. W., Grand Rapids 2, Michigan

MILL NOTES

(from page 32)

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Continued on page 56

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Which of these 3 products and services can you use from BECCO?

Solve Dye Problems with BECCO Silicate-Free Bleaching

"We dyed half a million yards this week... with no rejects!"

So reports a new user of Becco Silicate-Free Bleaching Process,* who previously suffered up to 25% rejects.

When complex silicates of calcium and magnesium formed scale on equipment and left resistant residues in the cloth, a Becco Sales Engineer studied the situation, and recommended Silicate-Free Hydrogen Peroxide bleaching solutions which eliminated the problem.

Silicate-Free bleaching won't answer **every** textile bleaching problem. But chances are one Becco process or another **will.** If you need help, use the coupon below to request a Sales Engineer's call. Also, ask for your free copy of Bulletin No. 71, "Continuous Bleaching of Cottons with Silicate-Free Peroxide Solutions".

*U.S. Patents 2,740,689 and 2,820,690

BECCO fmc

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York

Dept. TI-A

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☐ Please send a free copy of Becco Bulletin No. 71.

☐ Please have a Sales Engineer call.

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We got 'em—
You can have 'em!
They're FREE!

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No. 35 – Modification of Wool with Peroxygen Compounds.

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Becco's Four-Fold Engineering Service Program—offered free—includes:

1. Comprehensive survey of your facilities.
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Can you use this free Becco help, based on more years of experience with bulk handling of H_2O_2 than any other manufacturer? Use the coupon to let us know.

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RELIABLE VENTILATION IN A PACKAGE

"Buffalo" Belted Vent Sets

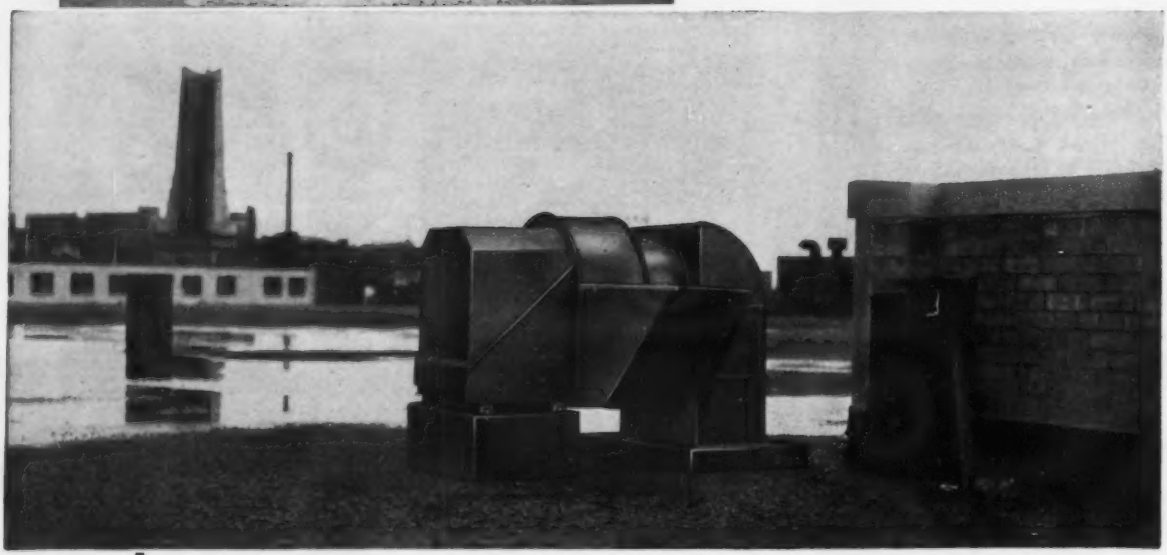
Quiet, ruggedly constructed and compact, "Buffalo" Belted Vent Sets are equally adaptable to indoor or outdoor installations. Double-curved blades prevent overloading. Inlet vane design reduces turbulence and air noise. Insures quiet, stable fan operation, even under unfavorable inlet conditions. Available with all-weather drive cover for roof or other outdoor installations. Capacities range from 500 to 20,000 cfm. Adjustable pitch motor sheaves permit variable capacity.

For full information, write for Bulletin 3720-A.

SPECIAL FEATURES AVAILABLE

All-Weather Cover and Rain Shield. Drain Connection in bottom fan housing. Access Door in scroll. Inlet and Outlet Screens. Non-sparking Aluminum Wheels. Enclosed or Explosion-Proof Motors. Ball Bearing Motors. Anti-Vibration Pads. Stainless Steel or Aluminum Construction for Units having all parts in contact with gas or fumes. Belt Guard. Gravity Type, Hand-Operated or Motor-Operated Outlet Shutters. Special Protective Coatings on Inside Housing and Wheel.

All "Buffalo" products feature the famous "Q" Factor—the built-in Quality that assures trouble-free satisfaction and long life.



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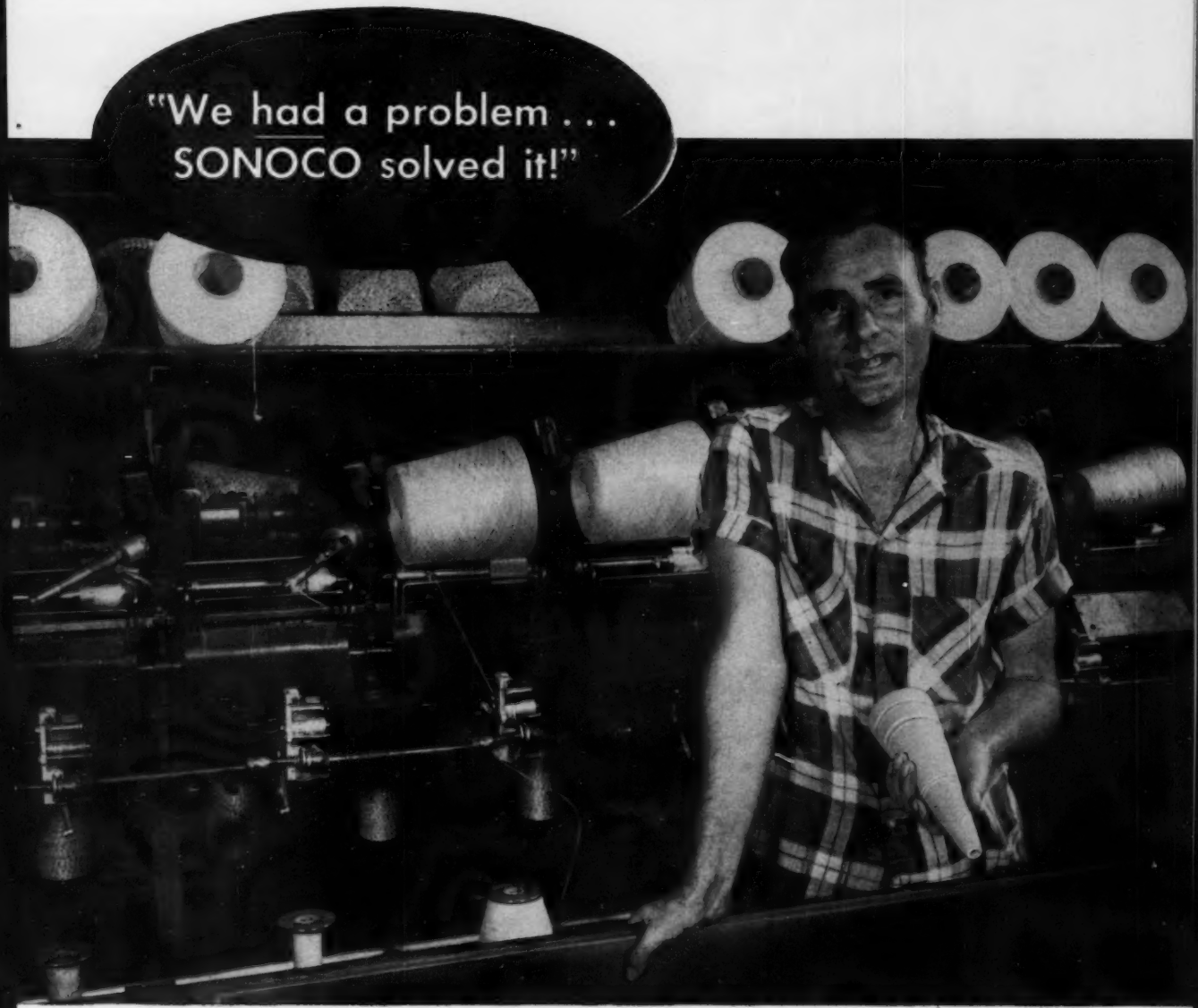
"Buffalo"



THE NEED: A cone surface which would prevent sloughing

Large packages of heavy cotton carpet yarn were being wound on Sonoco Super Cones. In some instances waste was occurring because the yarn sloughed off. Investigation showed that a different type cone surface was needed.

Drawing on past experience with similar problems, Sonoco quickly found the answer by developing a cone with heavy grooves placed at the critical points on the cone taper.

Problem solved . . . Sonoco-style! Matching the correct cone surface to the yarn is "all in a day's work" at Sonoco.

Only Sonoco, with its completely integrated manufacturing facilities and its research and development departments, is in a position to render this vital service to the textile industry. Let Sonoco's 60 years' experience and leadership help *you*. Consult your Sonoco sales engineer.

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Our 60th year
1899 - 1959

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Products for Textiles

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A NAME TO REMEMBER!

. . . for better sizing of spun warps containing synthetic fibers

Other names to remember

HOUGHTO-WAX FLAKE—
An aid to smoother sizing of spun yarns.

SULFOL 1450—
Self-emulsifying lubricant for cotton fibers.

WARP CONDITIONER 1429—
New synthetic cotton warp size for use with starch.

Rezosol is a polymer binder for sizing spun warps containing synthetic fibers. Its amazing increase in usage in sizing Dacron-cotton warps and other blends throughout the industry is due to—

1. Increased weaving efficiency
2. Marked reduction in rejects
3. Lower kettle costs
4. Reduced shedding
5. Easier mixing

Data sheets are available: write E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

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Ready to give you on-the-job service

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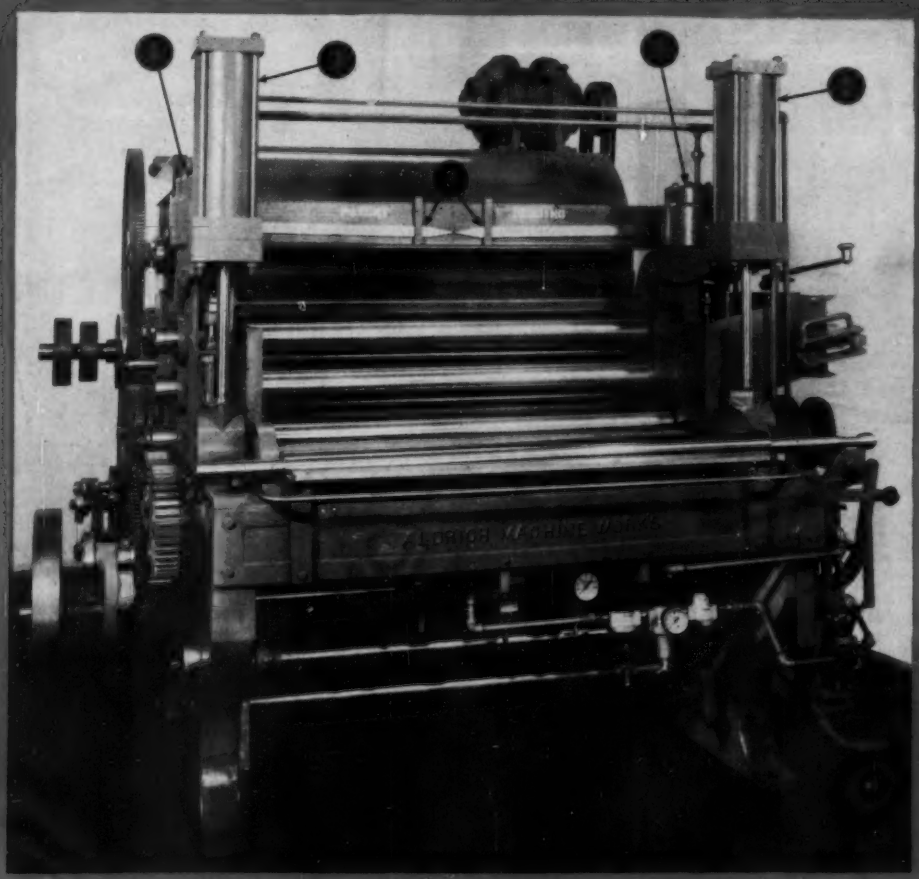


The ALDRICH HIGH COMPRESSION CALENDER

1. Diaphragm air cylinders apply resilient pressure upon Meehanite calender rolls, stronger and smoother than ordinary gray iron. Resilient pressure gives more uniform calendering, and protects the calender from shock loads. All pressure is released each time the calender stops, and is instantly applied when it starts. This is very important on some synthetics.

2. A constant lap weight indicator which shows the variations in the lap as they go through the calender, and not hours later on a separate test. With this indicator you test the lap as you make it, and can instantly detect any tendency to a big-ended lap.

3. Air cylinders apply pressure directly to the top of each calender rack. Both calender racks are tied together with the usual cross shaft to prevent big-ended laps. The racks rise automatically when the calender stops for doffing, but are run down independently by the picker tender after the lap is threaded.

AldricH MachinE WorkS

Greenwood, South Carolina

NEW D & F DEVELOPMENT...

Variable Speed Ring Spinning

Jumps Woolen Yarn Production 15% and More

As demonstrated at the 1958 Greenville Textile Show. For mill owners, managers, engineers and operators who demand greater productivity.

NOW AVAILABLE—For New or Present Model F's

Profit-minded management is quick to recognize the advantages of this new D&F Development of Variable Speed Spinning. Management is also quick to question, "why continue to operate at conventional spinning speeds," . . . when a new D&F Model F, with an Adjustable Variable Speed Motor Drive and other technological advances, can UP woolen yarn production 15% or more. Furthermore, the Model F's already in your mill can be modernized economically to approximate similar increases.

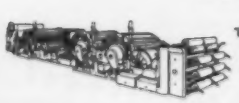
PROOF BY COMPARISON

Comparative Production Figures ("Standard Conventional Speeds Vs. Variable Speed"), previously published by Davis & Furber, show the type of daily increase in yarn production achieved in actual mill installations. Send for these production figures. Compare them with your own. See what these increases can mean to your own profit picture.

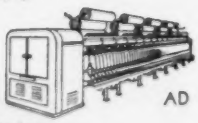
INVESTIGATION PAYS — GET THE FACTS NOW

Write us for the material available on "Variable Speed Ring Spinning for Woolen Yarns." Or call us direct for immediate action.

DAVIS & FURBER
MACHINE COMPANY



TEXTILE MACHINERY DESIGNERS AND MANUFACTURERS
North Andover, Mass.
Charlotte, North Carolina



AD 14-1

Member — American Textile Machinery Association

CARDS • SPINNING FRAMES • PREPARATORY MACHINERY • WARP DRESSING MACHINERY • FINISHING MACHINERY
MACHINERY MODERNIZATION • ACCESSORIES, SUPPLIES, CARD & NAPPER CLOTHING, GARNET WIRE, TAPES & APRONS
SPARE PARTS • TECHNICAL SERVICE & CONSULTATION

MILL NOTES

(from page 56)

bus, Ga. Replacement of equipment will result in better working conditions for the firm's 2,000 employees.

Construction of a dye house at the new **Fairhaven Mill,** Pickens, S. C., has begun. Machinery is expected to be installed by spring.

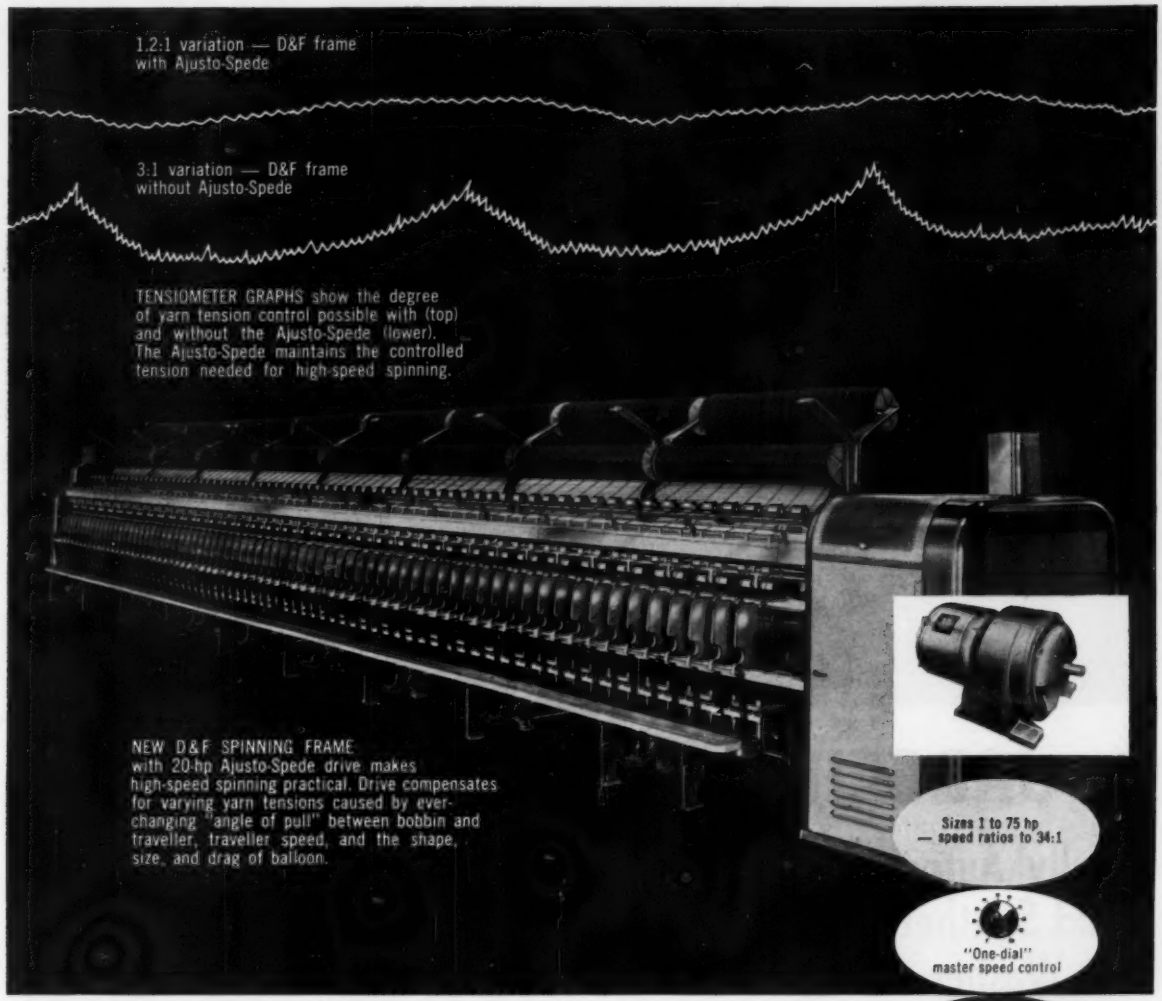
Negotiations have been completed for a new plant in Bluefield, Va., by **The United Piece Dye Works,** New York, to be used for development work and to supplement production. The 147,000-sq-ft, single story building will be equipped with machinery reserved from the liquidation of the firm's Lodi, N. J., plant. Operations will begin in 1960, according to a company spokesman.

An expansion program which will include the installation of 32 new knitting machines and an additional building with 2,800 sq ft of floor space has been announced by **Yanceyville** (N. C.) **Knitting Mills, Inc.** The firm manufactures half-hose.

The new plant at Robbins, N. C. of **Carolina Lace, Inc.,** has been formally dedicated. Shelton Thomas is

Continued on page 58

This mill whistle monument located in front of the Clinton Cotton Mills executive offices, Clinton, S. C., marks a passing era. The whistle was retired in 1956 after 60 years of service to the people of the Clinton area. The whistle was put into use in 1896 when the plant was first established by Mercer Silas Bailey, grandfather of current mill president Robert M. Vance.


1.2:1 variation — D&F frame with Ajusto-Spede
3:1 variation — D&F frame without Ajusto-Spede
TENSIOMETER GRAPHS show the degree of yarn tension control possible with (top) and without the Ajusto-Spede (lower). The Ajusto-Spede maintains the controlled tension needed for high-speed spinning.
NEW D&F SPINNING FRAME with 20-hp Ajusto-Spede drive makes high-speed spinning practical. Drive compensates for varying yarn tensions caused by ever-changing "angle of pull" between bobbin and traveller, traveller speed, and the shape, size, and drag of balloon.
Sizes 1 to 75 hp — speed ratios to 34:1
"One-dial" master speed control

Keeps yarn tension constant... ups output at least 20%!

Louis Allis Ajusto-Spede® drive on Davis & Furber spinning frame minimizes "ends down"...cuts costs...improves quality of yarn!

The smooth, precise control of yarn tension by the electronically-controlled Louis Allis Ajusto-Spede drive permits high-speed spinning of wool yarn. The big gain in production achieved by the new Davis & Furber spinning frame proves it!

In-the-mill production records show that uniform yarn tension brings the following benefits:

1. More yards and pounds of yarn per spindle hour.
2. More uniform yarn density and build of bobbin.
3. Fewer "ends down" and less downtime.
4. Lower per-pound production cost.
5. Production increases of 20% and more!

The Ajusto-Spede can be used as a standard adjustable-speed drive — or it can be used to cycle the speed of the frame to keep yarn tension constant. It enables you to select optimum speeds for spinning any grade of wool. Fewer "ends down" allows more free time for the operator to tend additional frames. The operator can easily adjust the controls to provide the optimum speed for the particular grade of wool, and the Ajusto-Spede *responds smoothly and automatically!*

Our drive specialists can help you increase production — to improve the quality of your spinning, as well as all other textile operations. Call your nearby Louis Allis District Office for application help — or write The Louis Allis Co., 443 E. Stewart St., Milwaukee 1, Wisconsin.

LOUIS ALLIS

AS-108

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE-SPEED DRIVES

How to Cut Costs in Fibre Processing

The SARGENT System...

Fully Automatic Handling of Natural and Synthetic Staple from Dye Kettle or Washer to Card.

Delivers uniformly dried, lofty stock at high volume rate. Releases manpower for other work. Better than 1,000 lbs. per hour produced continuously, day in, day out. Installations have cut processing costs better than one-third.
This highly efficient, economical Sargent-designed system has only five units:

1. Rotary type Wet Feeder takes air-blown wet fibres from the dyehouse, feeds them to squeeze roll machine. Has ball-bearing main cylinder with stainless steel teeth, a rotary comb, two heavy rubber aprons — one to feed fibre to main cylinder, the other to deliver fibres to nip of squeeze rolls.
2. Extractor has sectional rubber ring roll, hammered steel bottom roll with fine knurl. Pneumatic loading, two air cylinders, control panel and indicating dial. Working at 80 lbs. pressure estimated air consumption is 4 cfm.
3. Stock Fan and Cyclone Condensor. Stock fan takes fibres from extractor, delivers them to cyclone condensor mounted above hopper of dryer feed, opening fibres and conditioning them for even, smooth delivery to dryer.
4. Rotary Feeder delivers even layer of fluffed fibres to dryer conveyor. Designed to effect a semi-combing action, eliminating matted bunches for more uniform drying, fewer neps at card.
5. Dryer with Blow-Up Section. Air-flow is down through traveling stock, with up-draft at blow-up section, midway of dryer. A highly efficient way to redistribute fibres evenly over stainless steel perforated flight conveyor and to even out moisture content of all fibres. Equipped with air-operated recording type temperature controls complete with steam control valves and air filter. These dryers are designed for easiest cleanout, fastest installation and highest operating economy of any dryer on the market.

Every machine in the system boasts Sargent's rugged construction; with simplicity of design, minimum maintenance, dependable, steady performance. Here is a system to save you money, man-power, time. Let us give you complete details.

C. G. SARGENT'S SONS CORPORATION

Graniteville, SINCE 1852 Massachusetts

PHILADELPHIA • CINCINNATI • ATLANTA • CHARLOTTE • HOUSTON • CHICAGO • DETROIT • TORONTO

MILL NOTES

(from page 56)

the plant superintendent.

Continental Hosiery Co., Henderson, N. C., has been purchased by Glenn W. Powers, W. D. Cox, Jr., and R. D. Williams. The company is in full production.

Yates Bleachery Co., formerly operating as a partnership, has reorganized as a corporation known as **Yates Bleachery Co., Inc.**

Henry A. Hafner and associates have acquired assets of **La France Industries, Inc.,** at La France, S. C., and Woodstock, Ontario, Canada, plus La France branch stores in the U. S. and Canada.

A separate division for Belfast self-ironing fabrics has been established by **Deering Milliken Research Corp.,** Spartanburg, S. C. George Cocoros, former head of the product development, is in charge of the new division.

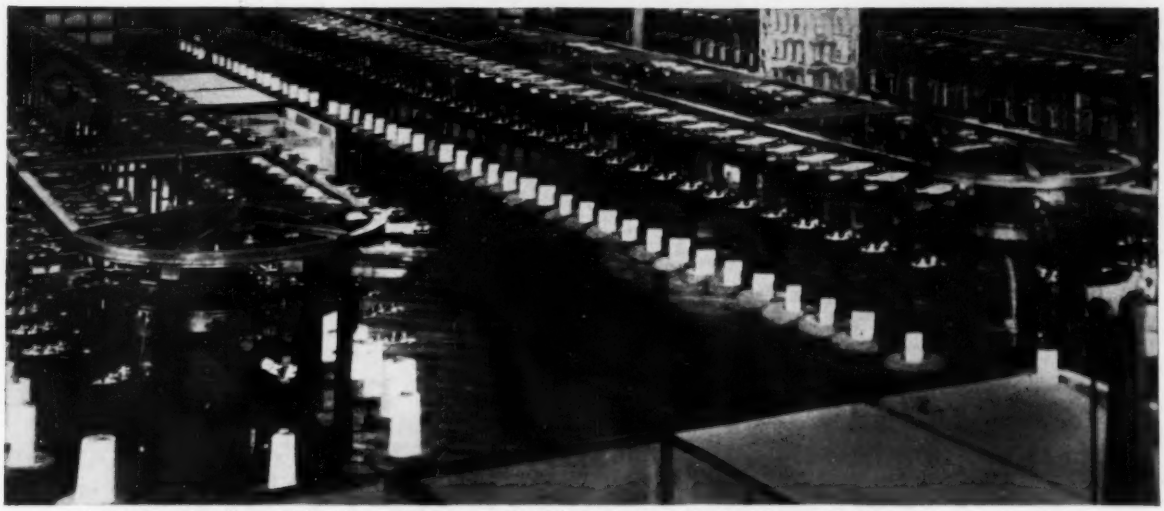
A 20,000 sq ft annex, scheduled for completion the first of the year, is being erected by **Harris-Marshall Hosiery Mills, Inc.,** Galax, Va. The firm will produce women's seamless hosiery in addition to men's and boys' socks.

George E. Grotz, district director of the National Safety Council, presented an Award of Merit to D. E. Sherrill, manager of the **Vulcan Plant,** Buena Vista, Va., of **Reeves Brothers, Inc.,** New York. The plant employees have amassed 2,115,000 manhours without disabling injury. The company manufactures synthetic rubber and plastic coated fabrics, as well as rubber blankets for offset and news printing.

West Georgia Mills, Inc., Whitesburg, Ga., will shortly open 6000 additional sq ft of new plant facilities to house 70 additional braiders. Producers of braided cord and braided cord products of cotton, nylon and polyethylene, the company has appointed Bolivar Aviles-Alfaro to promote the sale of their products in Latin America.

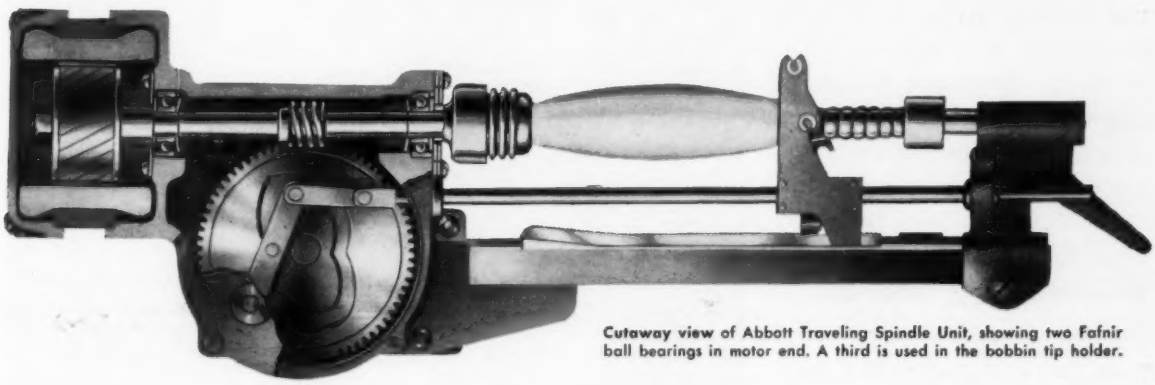
Lanett Bleachery & Dye Works, a division of West Point Mfg. Co., has established its own sales office in New York City. James W. Twaits, has been named soliciting sales agent, with offices located at 111 W. 40th St.

Precision-winding 2000 bobbins an hour per operator with...



Abbott Automatic Quiller, made by Abbott Machine Co., Inc. of Wilton, New Hampshire, features traveling spindle units, a single automatic head and supply hopper. One operator can run up to four machines.

FAFNIR BALL BEARING-MOUNTED SPINDLES



Cutaway view of Abbott Traveling Spindle Unit, showing two Fafnir ball bearings in motor end. A third is used in the bobbin tip holder.

With Abbott Automatic Quillers, it's the *spindles* that "make the rounds", not the operators. Mounted on Fafnir ball bearings, these traveling units precision-wind bobbins in one trip around the frame. Bobbin loading and doffing are automatic . . . make possible cost-cutting production of over 2000 bobbins an hour per operator.

To help insure yarn quality as well as quantity, Abbott uses two Fafnir ball bearings on the motor and worm shaft of each spindle, and one in the bobbin tip holder. These ball bearings provide the rigidity and low torque needed for exact, constant yarn tension and uniform spindle speeds. Double shields guard against loss of lubricant, and save maintenance.

Years of experience with textile machinery bearing requirements go into job-right applications like this. *You* can profit by Fafnir experience, too. Write The Fafnir Bearing Company, New Britain, Connecticut.

Partners in Progress — Abbott and Fafnir

FAFNIR
BALL BEARINGS

Fafnir Extra-Small Shielded Ball Bearings (left) and 200 Series Ball Bearings, also shielded, are used in the Abbott spindle. Bearings are designed to take thrust, radial, or combined loads.

Detail of two-shield ball bearing design

DOW | CHEMICALS: *key to textile progress*

In the textile business, progress is not only pleasant—it's absolutely necessary. In no other industry can today's big seller become tomorrow's white elephant quite so quickly. Chemistry often plays a major part in providing the tools that lead to product improvement. Knowledge of textile chemical developments is vital to the textile executive, but his time is limited and he must get his news on the run. Herewith, then, are some capsule news notes on chemicals textile men ought to know about.

You may wish to check certain items in this advertisement and forward to those concerned in your company.

ROUTE TO:

_____

_____

_____

_____

LATEX COATINGS RESIST PIGMENT PRINTING PASTE

Pigment printing that comes up smiling after repeated washings was once just a dream in the textile business. But not any more. Dow Latexes give the textile chemists a product that will do the job right. Fabrics printed with formulations based on this latex will withstand many washings.

One firm which has found Dow Latex ideal is M. Lowenstein & Sons, Inc., which uses it in its pigment printing process. (This, of course, is only *one* phase of the Lowenstein operation.) The house has long been known for fabrics of outstanding quality.

In addition to reduced crocking, formulations based on Dow Latex maintain this crock resistance and flexibility throughout extensive periods of aging. Extremely stable Dow Latex can be stored for extended periods of time prior to formulating.

This product is typical of the latexes being turned out at Dow to help solve the myriad problems of textile operators. There are literally hundreds of uses for Dow coatings in the industry, many of them money-savers as well as product improvers.

Pigment printing with Dow Latex is one phase of the extensive operations of M. Lowenstein & Sons, Inc. Lowenstein has a solid reputation in the textile industry for product reliability.

In felt and burlap coating, rug backing, fabric saturation, fabric wall covering, upholstery backing, rubber coating, pigment printing, hair-pad binding, vinyl coated fabric, glass reinforcing, shade cloth, nonwovens, scrap foam binding and solvent resistant coatings, Dow Latexes have proved themselves in leading textile mills throughout the country.

Many tough textile processing questions have been answered in the Dow laboratories, and textile men with production problems have learned that it's a good idea to consult Dow technicians about the use of latexes in new or unusual applications.

Plants engaged in any of the processes mentioned above will find consultation with Dow people valuable and informative—and they may come out of it with just the right latex to

clear that bottleneck that's been slowing production. It's worth serious consideration.

WRINKLE REMOVER . . .

ethylenediamine resins

Ethylenediamine has for many years served as the base for resins used in treating finished cotton. These resins provide wrinkle resistance and improved wrinkle recovery, thus making possible today's "wash-and-wear" fabrics. As an extra bonus they give improved dimensional stability and higher color retention.

Now EDA 98%, a product pioneered by Dow, offers cotton finishers greater quality and purity than ever before. In addition, more and more resin producers are finding that by using EDA 98% as a starting material they can gain important savings in production costs.

EDA 98% is the result of years of research, aimed at producing resins which are lighter in color and brighten the finisher's profit picture.

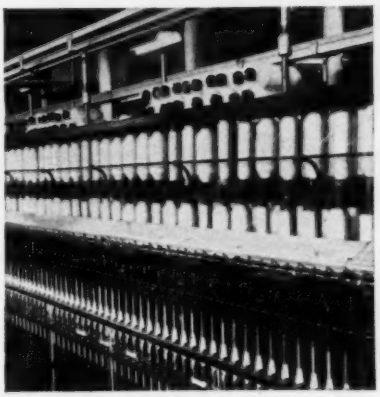
Our new bulletin "Dow Ethylene Amines", available upon request, discusses this and many other applications for EDA 98%.

POLYOLS (WORLD'S WIDEST LINE)

work for textile industry

The largest and most varied line of polyols in the world comes from Dow—and it's a safe assumption that one or more of them is at work in every textile operation in the country. Widely used as intermediates by manufacturers of textile chemicals, they also have value in a great number of applications in the textile processing plants themselves.

Especially important in the textile field are the polyethylene glycols, thanks to their water solubility, hygroscopicity and lubricity. As intermediates, they are vital to the production of the fatty acid esters used in washing, softening, dyeing and finishing—all operations where controlled surface action is important.



The polyglycols are easy to use. They need no solubilizing agents and can be mixed simply by stirring them into the water solution. Important also to textile operators, they are low in toxicity, nonstaining and do not become rancid or sticky.

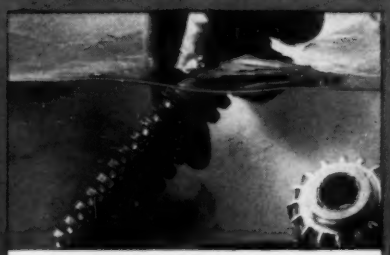
A few of the uses the textile industry has found for polyethylene glycols follow: yarn lubricants, sizes, emulsifiers, dispersing agents, dye solvents, antistatic agents, sizing or desizing fillers, scouring aids, fiber conditioners, finishing agents, leveling agents in dyeing.

★ ★ ★ ★

If you would like to know how Dow chemicals can help make your operation more profitable . . . how Dow technicians can assist you to achieve increased production efficiency — write THE DOW CHEMICAL COMPANY, Midland, Michigan, Chemicals Merchandising Department 2344FZ10.

FOUR MORE *with special meaning for textile men*

PENTACHLOROPHENOL
New 12-page booklet—"Low-Cost Pole Buildings for Industry"—describes in detail low costs and long lasting benefits of penta-treated pole buildings.



CHLOROTHENE®
Excellent solvent for maintenance cleaning. Safer, under most conditions of use in the textile industry, than any comparable solvent.

SODA ASH
There's a 44-page booklet available for textile operators about this indispensable product. Used in dye assist, scrubbing and bleaching.

DOWICIDE®
Treatment of warp size yarns with Dowicide product will permit longer, safer storage of gray goods.

DOW CHEMICALS
BASIC TO THE TEXTILE INDUSTRY

Glycol Ethers • Alkalies • Thickeners • Industrial Glycols • Glycerine
Chelating Agents • Ion Exchange Resins • Preservatives • Solvents • Polyols

THE DOW CHEMICAL COMPANY
Midland, Michigan

DOW

NO WICKS MEAN CLEANER PRODUCTS· FASTER PRODUCTION· LESS MAINTENANCE

OIL IS SUPPLIED TO BOTH TOP AND CONICAL BEARING SURFACES THROUGH SEAMS.
LESS OIL IS NEEDED.
TRAVELER DISTRIBUTES OIL.
Oil flows to the annular reservoir within the ring, then is drawn by capillary action through seams to the bearing surfaces.

It's the New HERR "M" TYPE Conical Ring

The best equipped textile mills in the United States have been gaining experience with Herr "M" type Conical Rings and have reported wonderful success during the past four years. They report a definite control of lubrication far superior to any wick lubricated ring. They have achieved a reduction in oil, a saving in maintenance, an increase in spindle speed, a reduction in yarn breakage, and have produced a much cleaner yarn.

The new "M" ring makes use of a different principle of carrying the oil to the bearing surfaces of the ring where it is needed. It is called capillarity and, because the distribution is so complete, less oil is required.

Phone us today — order enough "M" Rings to convert a machine. You will be pleased with the results of your test.

The 5" diameter $4\frac{3}{64}$" face Herr Conical Ring requires only one oil cup.

HERR MANUFACTURING CO., INC.

310 FRANKLIN STREET, BUFFALO 2, NEW YORK

FOR SPINNING AND TWISTING WORSTED, WOOLEN, RAYON, NYLON, ORLON, FIBERGLASS AND BLENDED YARNS OF ALL TYPES

DURAMOLD SHUTTLES

Last 3 times as long as wood

DURAMOLD—most versatile and strongest molded plastic shuttles on the market

Rugged Duramold Shuttles are manufactured from a single solid, uniform piece of Westinghouse Micarta, remarkably strong, grainless molded plastic, composed of laminated twill fabric impregnated with a phenolic resin, which provides greatest unidirectional strength.

You will get greatly increased shuttle life and lower maintenance costs when you use Duramold Shuttles because the engineering skill of Southern Shuttles Division has taken this superior material and produced the strongest shuttle ever made.

The method of molding and manufacture of Duramold Shuttles permits much greater versatility of construction, such as tip location, eye location, chamber lengths, shuttle widths, etc.

Vastly improved material strength reduces premature failures, prevents splitting and splintering. In fact, the surface becomes smoother with use, thereby reducing friction.

Denser material allows more positive seating of the shuttle parts, reducing the possibility of loosening and rocking to a minimum.

Extension of the tough side wall laminates all the way to the tip greatly increases the strength of this section. Wall sections are thicker for greater strength, and the corners at both ends of the chamber are reinforced. Macerated end blocks are molded into the shuttle to provide flexibility for absorbing shock at these points.

Take advantage of the tremendous savings possible in your weaving room costs with Duramold Shuttles.

Other Plants and Offices: Granby, Quebec, Canada—Lawrence, Mass.—Greensboro, N.C.—Atlanta, Ga.—Textile Supply Co., Dallas, Texas—Albert R. Breen, Chicago, Ill.

Stehedco
STEEL HEDDLE MFG. CO.
PHILADELPHIA 32, PA.
SOUTHERN SHUTTLE DIV.
GREENVILLE, S.C.
Southern

9-S-56

TEMPERED — QUALITY Stehedco CONTROL — STEHIDE

World's largest manufacturer of all type Shuttles
Comparison made them famous

A revolutionary concept in yarn manufacture...

the ROCKFORD MANU

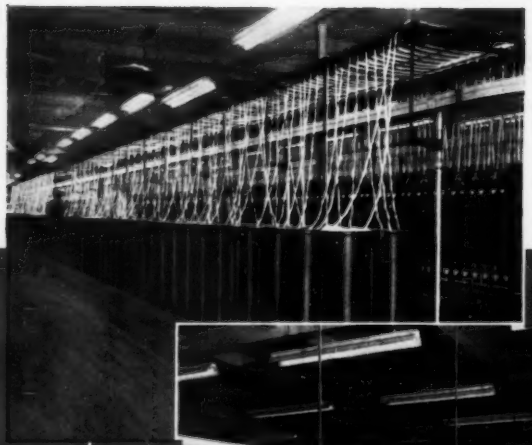
An outstanding SACO-LOWELL Sliver-Spin Installation which increased production with less machinery and lower overhead.

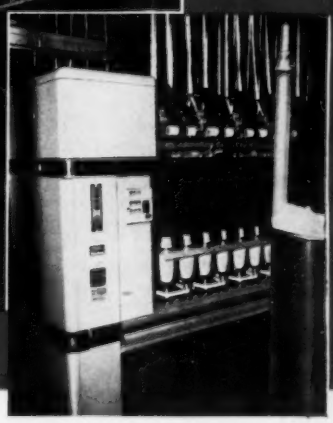
Opening quality was improved by the application of Feed Regulators and High-Speed Combs to the Feeders, and re-conditioning the remainder of the opening machinery. Filters were added to both the opening line and pickers to take care of the dust and fly inherent in the type of stock being processed.

NEW 18" x 42" SACO LOWELL ANTI-FRICTION CARD COILERS deliver 43 pounds per can to the Versa-matic Drawing.

EXTENDED CREELS PERMIT using creels with 10 ends of 60 grain card sliver per delivery of VERSA-MATIC. Signal lights, integrated with the stop motions, pinpoint location of broken ends, indicate empty cans and sources of frame stoppage.

FACTURING COMPANY STORY





THESE SLIVER SPIN GWALTNEY FRAMES are fed by 12 deliveries of twin-strand Versa-matic 15″ x 42″ cans. Each contains two separate coils of 55 grain sliver. Only one process of drawing is required. The special drafting system developed for sliver spin permits using drafts of over 52 for some counts.

THE 15 GWALTNEY SLIVER SPIN FRAMES, totaling 3,600 spindles, have produced over 74,000 pounds of 2's — 8's yarn in a single 3-shift week. With Sliver-Spin there is no roving process at all.

A close-up view of one of the **NEW 4½″ GAUGE GWALTNEY SLIVER SPINNING FRAMES** which spin counts ranging from 2's to 8's for the braiding of cord.

This installation is a successful approach to the concept of spinning direct from sliver. It inaugurates a new era in modern yarn manufacture which will tear down the barriers to profitable mill operation. The Rockford Manufacturing Company installation is the indisputable proof that Saco-Lowell technical achievements in machinery when combined with progressive "look to the future" mill management can increase production and spin better yarn with less machinery and at lower operating costs. The complete Rockford story is available in Bulletin form, write for your free copy. Better still, have a Saco-Lowell Sales Engineer prepare a Sliver-Spin program where applicable for your mill — there's no obligation.

THE STANDARD OF QUALITY AND PERFORMANCE Since 1813

SACO-LOWELL TEXTILE MACHINERY DIVISION

SACO-LOWELL SHOPS

Executive & Sales Offices — EASLEY, S. C.

Branch Sales Offices — ATLANTA, GA., BOSTON, MASS., CHARLOTTE & GREENSBORO, N. C.

Production Now Up To 2000 a Month

Meeting the constantly growing demand for UNIFIL* Loom Winders really keeps us on our toes! To date, we've shipped out over 20,000. And almost every month we have had to step up production!

Most mills first learn about the superior performance of UNIFIL Winders through a Leesona® "Profit Factor Analysis." This detailed survey of the particular mill's filling yarn preparation methods shows management where and how UNIFIL Loom Winders can improve both fabric quality and economy of weaving operations. Once installed actual performance is ample reason for reordering!

UNIFIL Loom Winders bring the entire process of filling yarn preparation to the loom . . . provide all the advantages of weaving-from-a-cone. And mills everywhere are applying these advantages to all sizes and types of yarns . . . synthetics as well as cotton. For example: quality of fabrics woven from finer count yarns has been greatly improved . . . fabrics with textured yarn filling can be woven with a uniformity not possible before. What's more, the combined savings made possible by this advanced method can't help but speed up pay-out of the investment.

Let a "Profit Factor Analysis" show you how UNIFIL Loom Winders can improve weaving *and* profits in your mill. Ask your Leesona Sales Engineer in Boston, Philadelphia, Charlotte, Atlanta, or Los Angeles. In Canada: Montreal or Hamilton. Or write Leesona Corporation (new name of Universal Winding Company), P. O. Box 1605, Providence 1, R. I.

A few of many progressive mills that are modernizing with UNIFIL Loom Winders

AMEROTRON CORPORATION
BERKSHIRE HATHAWAY INC.
BURLINGTON INDUSTRIES, INC.
CANNON MILLS CO.
BEMIS BRO. BAG CO.
PONEMAH MILLS
DRAYTON MILLS, INC.
JUDSON MILLS
UNITED MERCHANTS & MFRS., INC.
GLEN RAVEN SILK MILLS, INC.
EXPOSITION COTTON MILLS
GREENWOOD MILLS
FRANK IX & SONS, INC.
MARION MFG. COMPANY
WILLIAM SKINNER & SONS
J. P. STEVENS & CO., INC.

LEESONA

*UNIFIL *is a registered trade-mark of Leesona Corporation*

MAIN INSTRUMENT PANEL at Russell Manufacturing Company has instruments to record and control steam flow, water temperature, "J" box temperature, steam pressure and washer water flow.

Russell Manufacturing Company runs cloth faster, saves steam and water, with new Honeywell-controlled bleach range.

Russell Manufacturing Company of Alexander City, Alabama has combined rope and open width bleaching in a fully controlled range. Honeywell designed the automatic control system which not only permits cloth to run at speeds up to 200 yards per minute, but also has greatly reduced steam and hot water consumption.

One master recording-controller positions a three-way mixing valve to maintain water temperature at the same pre-set level in all three washers. No water is wasted. It's metered in exact amounts for proper processing and shuts off automatically after five minutes of range downtime. This saves an estimated 1,250 gallons of hot water alone every time the process is shut down.

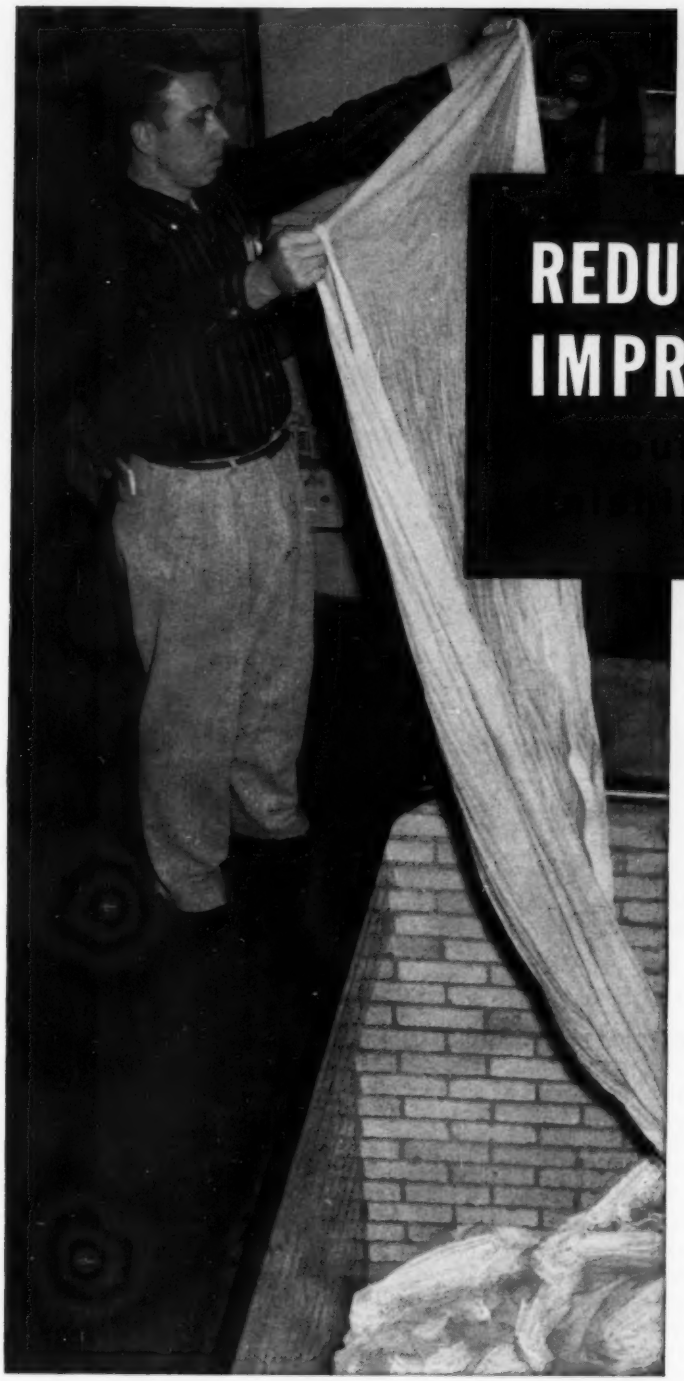
Through the combination of open width in "J" boxes, desizer, and padders and rope form in the washers, Russell saved $33,000 in equipment and installation costs and 35 feet of floor space.

In your own mill, automatic control can upgrade product quality and bring new economy and efficiency to any process. Your nearby Honeywell field engineer can tell you how. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.

Honeywell

H HONEYWELL First in Control



Let Pennsalt show you how to . . .

REDUCE COSTS and IMPROVE QUALITY

Personalized technical service tailored to your needs . . . plus quality chemicals . . . can mean substantial savings in processing and improved quality in your finished goods. Call on PENNSALT for TEXTILE FINISHING SERVICE if you:

- want your fabrics better prepared for peroxide bleaching
- find that your fluidities are too high
- want to cut costs by reducing bleaching chemical requirements
- want to produce fewer seconds

An experienced representative will study your process from greige goods to finished product and provide you with reliable solutions to these and other textile finishing problems. Industrial Chemicals Division, PENNSALT CHEMICALS CORPORATION, Three Penn Center, Philadelphia 2, Pa.

Specify PENNSALT QUALITY CHEMICALS when you buy

caustic soda — hydrogen peroxide
chlorine — ammonium chloride
surfactants — ferric chloride

See our Catalog in Chemical Materials Catalog

Industrial Chemicals Division

SALES OFFICES: CHICAGO • DETROIT • NEW YORK • PHILADELPHIA
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Pennsalt Chemicals
ESTABLISHED 1850

Know your AIM*...Indian Head Mills, Inc. does...

Steel Strapping Machine closes textile boxes

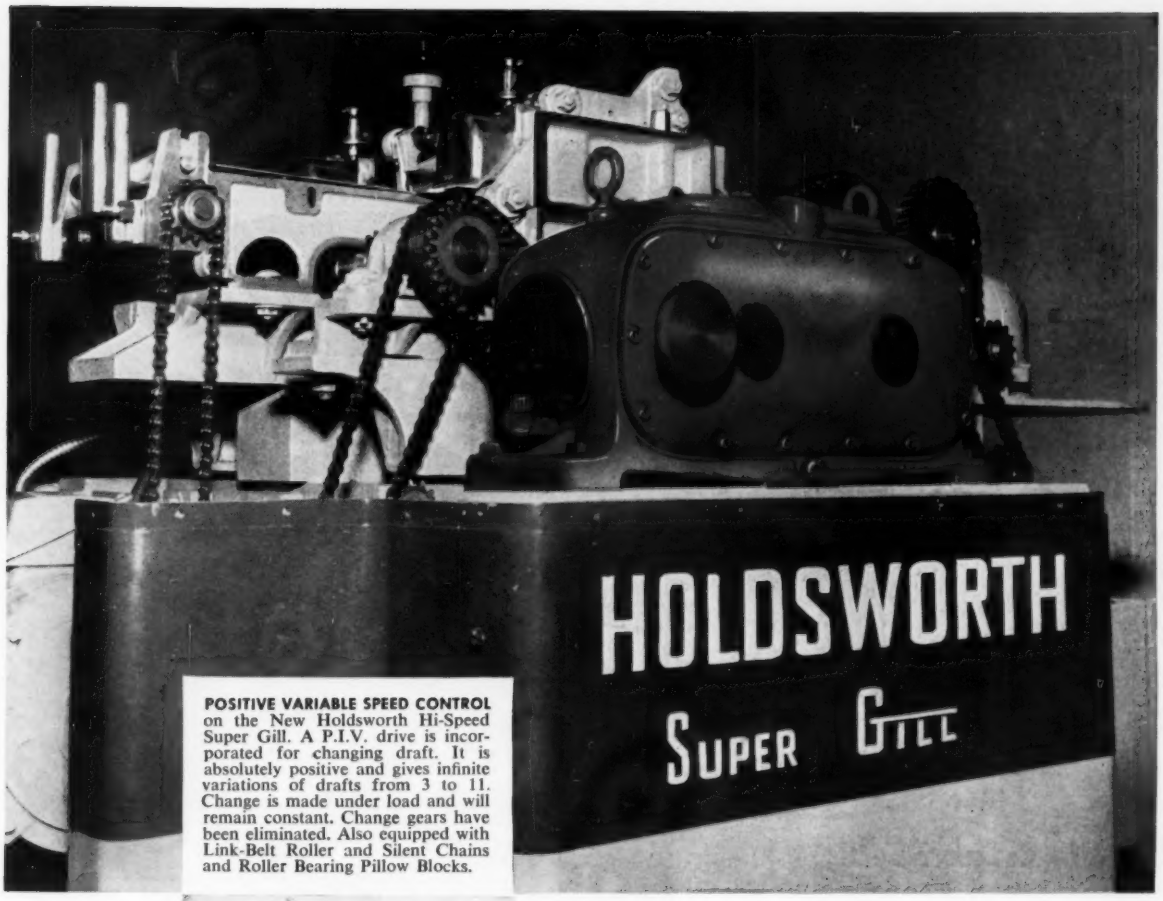
Acme Idea Man J. B. Quarles cooperated with Indian Head Mills, Inc. on this modern installation.

INDIAN HEAD MILLS, INC., Cheraw, South Carolina, uses an Acme Steel Model F1 Semi-Automatic Strapping Machine to close and reinforce boxes of their well-known, quality, "Indian Head" brand textiles. Now, only one man is required for the strapping operation . . . a saving of 8 to 12 man hours per day. (Idea No. S5-5)

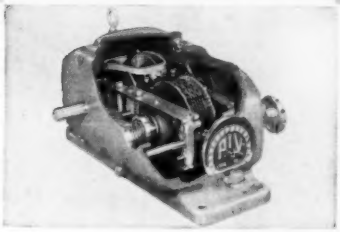
Served by a conveyor system, the F1 applies as many steel straps as desired in a matter of seconds with uniform, pre-determined tension. Electrically powered, the machine is controlled by push-buttons. Strap is cut automatically, and ends are instantly and permanently joined by spot welds. The machine handles containers of various sizes in any sequence without adjustment. A special track feeds the strap to within easy operator reach.

***Know your Acme Idea Man.** He is sure to provide clues to better ways of protecting and shipping your products. Call him today at a nearby Acme Steel office. Or write Dept. TIS-109, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois. In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Ave., Toronto 13, Ontario.

ACME STEEL STEEL STRAPPING



POSITIVE VARIABLE SPEED CONTROL on the New Holdsworth Hi-Speed Super Gill. A P.I.V. drive is incorporated for changing draft. It is absolutely positive and gives infinite variations of drafts from 3 to 11. Change is made under load and will remain constant. Change gears have been eliminated. Also equipped with Link-Belt Roller and Silent Chains and Roller Bearing Pillow Blocks.



Unique in operation . . .
unmatched in accuracy . . .

For stepless, slipless speed changing

. . . there's nothing like P.I.V.

Where operations requiring variable speed control can't tolerate slip—no other mechanical drive is equipped for the job like Link-Belt P.I.V. With its all-metal, self-tooth-forming chain that maintains positive grip with radially grooved wheels, it offers a degree of accuracy . . . a level of efficiency—unique in the field. Speeds can be varied in an instant, regardless of load, without interrupting the driven machine. And P.I.V.'s all-metal construction ignores atmospheric conditions.

The complete story is contained in Book 2274. Your nearest Link-Belt office or authorized stock-carrying distributor will supply a copy.

P.I.V. LINK-BELT
VARIABLE SPEED DRIVES

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 19,258

MRC PILLOW BLOCKS and FLANGE UNITS with *Labri-Seal® BALL BEARINGS

NEW MRC *Labri-Seals®*

combine the advantages of

- → **a rotating flinger**
- → **labyrinth seal**
- → **and positive contact synthetic rubber seal.**

Their efficiency in keeping grease in and dirt out has been proven in many environments involving extremes in dirt and moisture.

MRC *Labri-Seal®* ball bearings are pre-lubricated at assembly eliminating any need for further lubrication.

Write for FORM 1550-1

PERMANENTLY LUBRICATED
POSITIVELY LOCKING
SELF ALIGNING

Write OUR Engineering Department regarding YOUR bearing problems

MARLIN-ROCKWELL CORPORATION
Executive Offices: **Jamestown, N.Y.**

MRC BALL AND ROLLER *bearings*

Si

". . . . he worked his way through school tending bar . . . ."

Wherever Si learned his trade, they taught him stickability. Sure, he's been stuck on a technical problem—many a time. But by sticking to it he usually becomes unstuck.

When you have a wet processing problem that's got you stuck, send it to Si.

We pay him to stick until you're unstuck.

Warp Sizing: *Softeners, Binders, Penetrants, Ty-In Penetrants, Shuttle Dressing, Waxes.*

Wet Processing Chemicals and Auxiliaries: *Dye Assistants, Penetrants, Rewetting Agents, Sanforized Fabric Oils, Detergents, Scouring Agents, Softeners.*

Niagara Twist-Setter: *Yarn Conditioning Penetrants.*

Seyco Warp Lubricator.

Headquarters for textile chemicals

SEYDEL-WOOLLEY & CO.

748 RICE STREET, ATLANTA, GEORGIA

SEYCO

LOOK FIRST TO **POWELL**

Features of Construction:

Powell Corrosion Resistant Valves are made in stainless steel, Monel, nickel, Hastelloy alloys, aluminum and other special corrosion resisting metals.

Solid and double wedge discs of gate valves are interchangeable. They are precision machined and fitted and are accurately guided throughout their entire travel. This prevents drag of the disc over the seat faces, eliminating wear of seating surfaces and stops undue vibrational noises.

O.S.&Y. Valves—Stems are threaded and guided through a bronze bushing in upper yoke. (Bushings made of other alloys can be supplied on special order.) A compression lubricant fitting in upper yoke is provided to lubricate the stem and bushing threads and to reduce wear. A convenient shelf is cast on the inner sides of yoke arms for suspending the gland when renewing the packing.

All valves are regularly packed with Teflon Packing. Globe and "Y" valves are available with metal or Teflon discs.

Globe, Angle, Gate and "Y" valve stems are back seated for repacking under pressure when fully open.

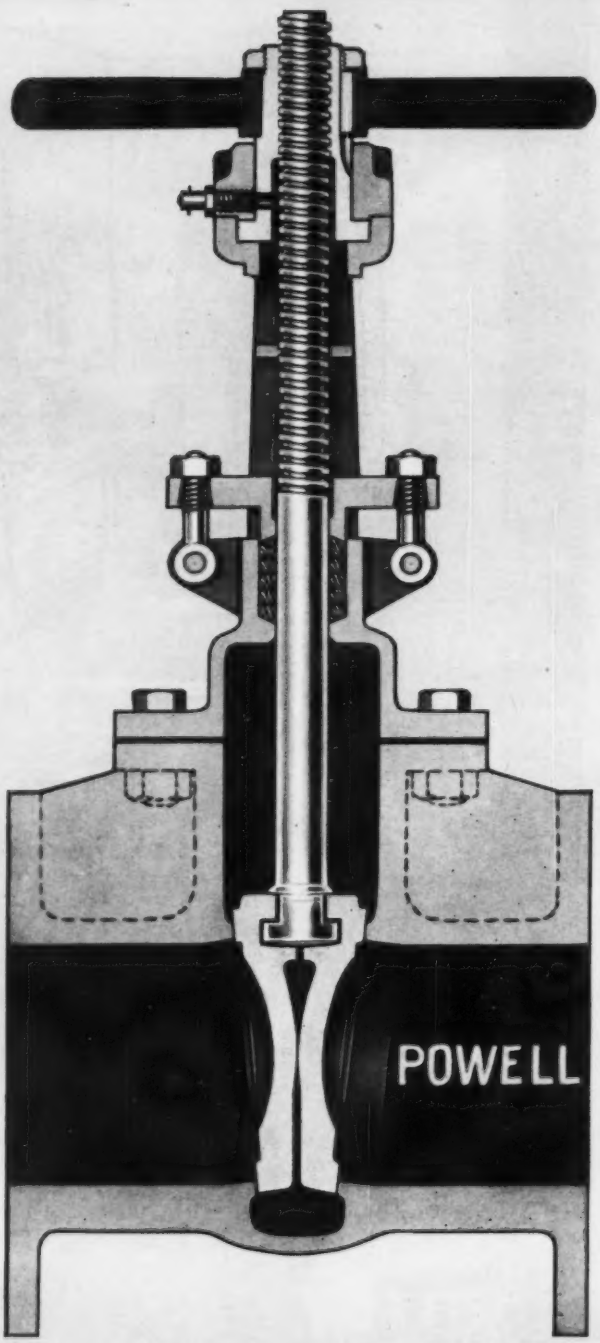


Fig. 2453 DG (Sectional)—Large Stainless Steel O.S.&Y. Gate Valve. Available with interchangeable solid or split wedges. Wedges are fully guided throughout their travel.

POWELL...world's largest family of valves

FOR CORROSION RESISTANT VALVES

Over a quarter century ago, Powell introduced the Corrosion Resistant Valve. Now, after years of pains-taking experiments and exhaustive research, Powell offers Valves to handle practically every corrosive fluid—valves of every design, and in the largest possible selection of metals and alloys.

For all your flow control requirements—water, oil, gas, air, steam, as well as corrosive fluids—Powell has the right valve in the right size and the right metal. Consult your local Powell distributor or write directly to us.

Fig. 2633—Large, Stainless Steel Swing Check Valve for 150 W.P. Sizes, 2" to 12".

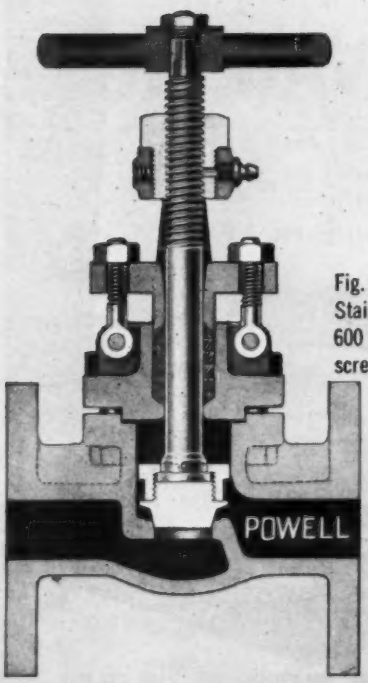
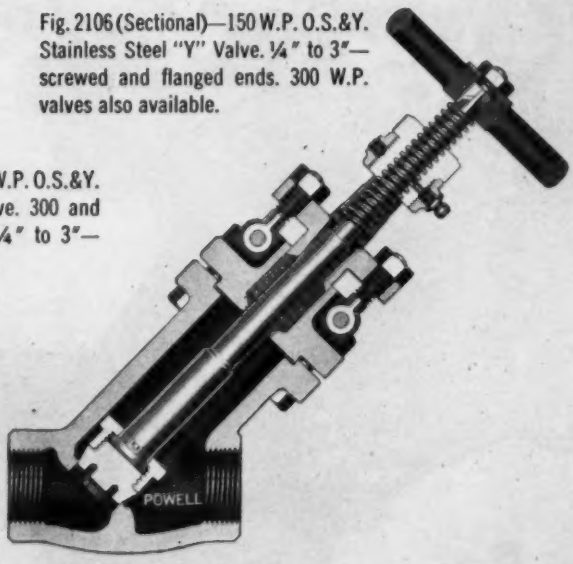


Fig. 2475 (Sectional)—150 W.P. O.S.&Y. Stainless Steel Globe Valve. 300 and 600 W.P. also available. ¼" to 3"—screwed and flanged ends.

Fig. 2106 (Sectional)—150 W.P. O.S.&Y. Stainless Steel "Y" Valve. ¼" to 3"—screwed and flanged ends. 300 W.P. valves also available.



THE WM. POWELL COMPANY • *Dependable Valves Since 1846* • **Cincinnati 22, Ohio**

A WHOLE RANGE OF STARCHES AND GUMS

Penford Gums are extremely versatile hydroxyethyl ether starches . . . well qualified in both fluid and dried film states as Textile Wrap Sizes for Cottons, Worsteds, Synthetics and blends.

On combed yarns, their superior filming properties impart maximum protection against the abrasive action of looms in high count constructions.

On hydrophobic fibers, Penford Gums adhere firmly and impart extensibility to sizings on these difficult-to-size yarns.

On worsteds, they stay fluid and non-congealed, allowing operations at temperatures as low as 160°F. which prevents damage to wool fibers. They provide excellent weaving protection.

For Special Jobs—
wire Technical Service
Penick & Ford, Atlanta

HAVE GUM WILL TRAVEL

Penford Gums

Leaders in Epoxy Starches

U.S. Pat. Nos. 2,516,632; 2,516,633; 2,516,634.

Penick & Ford

PENICK & FORD, LTD.
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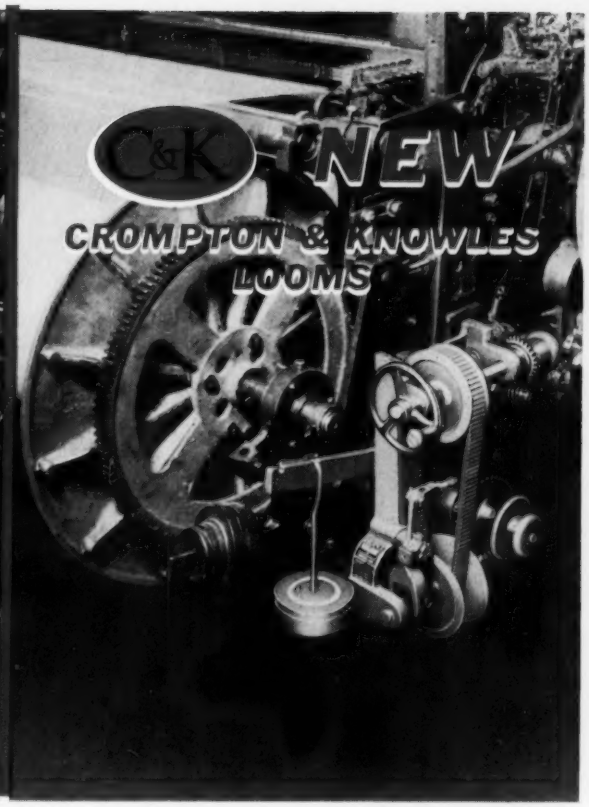
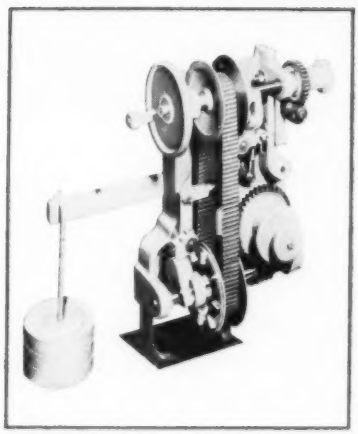
1531 MARIETTA BLVD., ATLANTA, GA.;

Manufacturer of Douglas Pearl • Crown Thin Boiling • Douglas Dextrines • Clearsol Gums for the Textile Industry



NOW HAVE THE HUNT LET-OFF



Not only is the Hunt Let-Off available for all models of existing looms, but now it is available on new looms from Draper Corporation and Crompton and Knowles Corporation. This positive and automatic Let-Off maintains constant and even tension from full to empty beam, beam after beam without attention or adjustment. Thousands are now in operation on looms weaving plain and fancy cottons, synthetics, woolens and worsteds. It has been proven in the mill that a Hunt Let-Off eliminates wavy cloth and greatly reduces set marks. Not only does the Hunt Let-Off make it possible to weave perfect cloth at lower labor costs, but it increases production by reducing loom downtime for "fixing."

We've changed our name

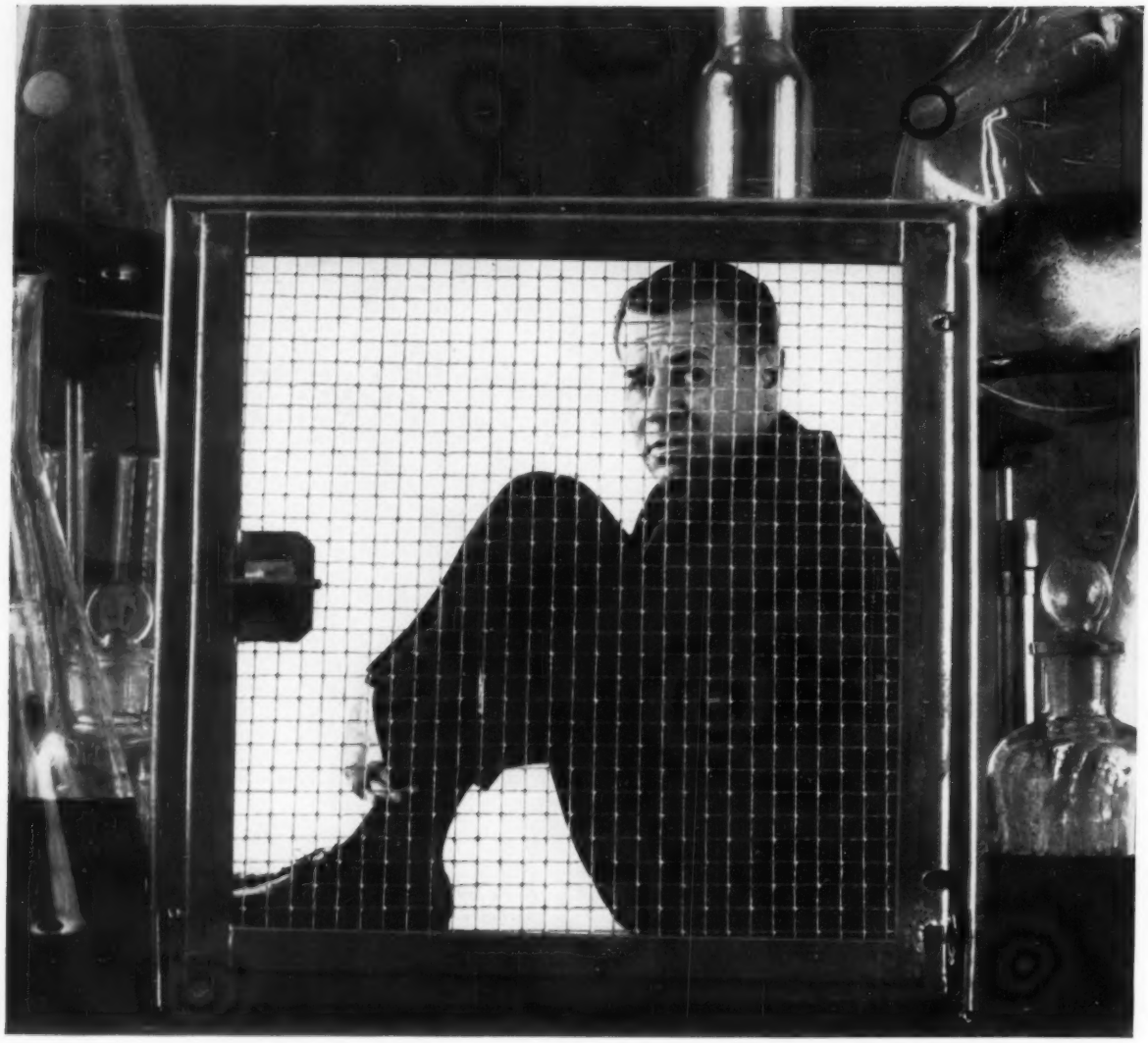
For more information write, wire or phone:

DRAPER CORPORATION, HOPEDALE, MASS.
CROMPTON & KNOWLES CORPORATION, WORCESTER, MASS.

OR

SOUTHERN MACHINERY COMPANY

(FORMERLY SOUTHERN LOOM DEVELOPMENT COMPANY)
BOX 3217—STATION A, 5806 AUGUSTA RD., GREENVILLE, S. C.



Is it a proven fiber—or are you the guinea pig?

Many a fiber that flourishes in the test tube, pratfalls when put to practical consumer use.

There's only one test you can depend on in textiles, and that's the *test*imonial of the consumers who use it, day after day. That's where ACRILAN* comes through with flying colors!

Better than 9 out of 10 of your best consumer customers know Acrilan.

They know it—and they buy it. Blankets of 100% virgin Acrilan outsell anything else in their field. Wash & wear garments made with Acrilan are racking up laudable figures. ACRILAN* carpet (made with Chemstrand's acrylic carpet fiber) is rolling up successes for the many fine mills making it. This talented fiber is now established and *proven* in area after area of textiles—backed by consistent, compelling advertising that has sold America.

Why this success? Why Acrilan's certain performance? Because Chemstrand chemistry created Acrilan to meet the needs of *today's* market. Acrilan means versatility—a thousand faces. Easy, economical handling. Looks that last. Performance *proven* in the crucible of consumer use.

Don't let your business be the guinea pig for unproved fibers. Next time you're faced with a fiber, test it with these questions. Is it known? Advertised? Will it sell? Will it perform? Is it proven in use?

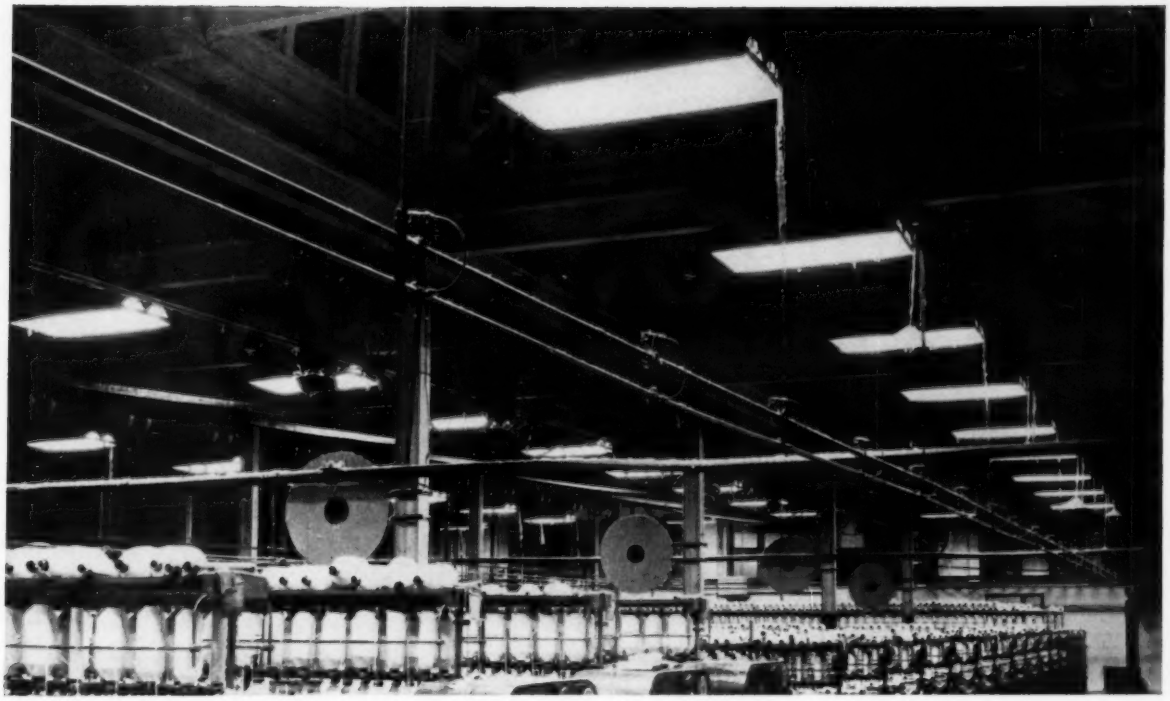
With Acrilan every answer is *yes*.

*Registered trademark of The Chemstrand Corporation for its acrylic fiber

ACRILAN

Chemstrand makes only the fiber; America's finest mills and manufacturers do the rest.

THE CHEMSTRAND CORPORATION • GENERAL SALES OFFICES: 350 FIFTH AVE., NEW YORK 1, N. Y. • DISTRICT SALES OFFICES: 350 Fifth Ave. New York 1; 3¹⁄₂ Overwood Rd., Akron, Ohio; 197 First Ave., Needham Heights, Mass; 129 West Trade St., Charlotte, N. C.; California Office: 707 South Hill St., Los Angeles 14. Canadian Agency: Fawcett & Co., 34 High Park Blvd., Toronto, Canada • PLANTS: ACRILAN® ACRYLIC FIBER—Decatur, Ala.; CHEMSTRAND® NYLON—Pensacola, Fla.



You can't afford to let your mill walls

GROW DARK WITH MILDEW

● Cost-conscious textile mill maintenance men everywhere are solving moisture, corrosion and mildew problems with MINNESOTA PAINTS' MINNLITE fume-proof, rubber base paint. MINNLITE is a specially formulated paint ideally suited to the damp and corrosive conditions commonly found in textile mills.

MINNLITE can help you substantially reduce wall and ceiling maintenance costs because it:

RESISTS MILDEW. MINNLITE stays whiter and cleaner looking longer because it resists fungus growth even when exposed to warm, humid atmospheres for long periods of time.

UNAFFECTED BY MOISTURE. MINNLITE is a rubber base paint made from the latest synthetic rubbers, processed especially for protective coatings. MINNLITE won't peel, blister, stain or soak through. It is completely unaffected by moisture in any form.

MINNLITE IS NON-YELLOWING even under the most unfavorable conditions. In addition, its high gloss surface permits only a minimum amount of lint adherence. So MINNLITE coated walls and ceilings stay bright and clean looking longer.

IMPROVES LIGHTING. By resisting fungus growth, shedding lint, and retaining its whiteness, MINNLITE reflects more light longer and increases the efficiency of existing mill lighting.

RESISTS STRONG CHEMICALS. MINNLITE remains unaffected by gases. It also combats rust and corrosion from both acid and alkaline conditions.

Working out of the Atlanta factory, MINNESOTA PAINTS' staff of textile mill paint salesmen have had years of experience with the particular paint problems encountered in textile mills.

Call or write Call PLaza 3-5151 or write our Atlanta office—1314 Murphy Ave., S. W. Our staff of paint experts will help you reduce mill maintenance and, at the same time, keep your mills brighter and cleaner longer between paint jobs.

Minnesota PAINTS

MINNESOTA PAINTS, INC.
Minneapolis 15, Minnesota
PLANTS: Atlanta • Minneapolis • Ft. Wayne • Dallas

Bolster Briefs

by Ron Kinney

Manager, Textile Sales

During the past 12 years Ron Kinney has had occasion to visit almost every textile mill in the U. S. A. In these columns he answers some vital questions about bolsters and spindle maintenance —answers that could help improve production and cut operating costs.

Does SKF sell complete spindles?

No. We market the anti-friction bolster unit to all the leading spindle manufacturers. They make the finished product.

Does one type of SKF bolster fit all applications?

No. There are many different sizes and designs to fit all existing requirements. The size of the bolster depends on several factors, such as gross weight of the package, ring diameter, speed, etc.

What do you have in the way of a new bolster?

The HF series is our latest development. It comes as the result of over 30 years experience in the textile field with almost 50,000,000 SKF equipped spindles having been placed in operation throughout the world. Many of the original installations are still giving good performance!

What will the HF equipped spindle do for me?

It gives you greatly increased capacity for heavier loads at higher speeds. It is specifically designed for those mills that want increased traverses and production.

What about lubrication?

The HF design has eliminated all frictional damping. By so doing, the relubrication periods are few and far between. For instance, you can operate the HF 2 size for 20,000 hours before it is necessary to relubricate. Then all you do is merely remove the blade, withdraw the old oil and add the new. The bolster and base remain on the spindle rail! Just think, over 3 years of trouble free performance and then with a cost of only a few pennies, you are ready to go again.

Is it necessary for us to specify SKF when ordering spindles?

Yes, it is a good policy, because in this way you are assured of receiving the genuine product which has been time proven and accepted. As a form of insurance to you, it is best to specify SKF—no substitutes accepted.

5941

GOT A PROBLEM?
SEND YOUR QUESTION TO
"BOLSTER BRIEFS".
c/o SKF INDUSTRIES, INC.
P. O. Box 6731,
Philadelphia 32, Pennsylvania

SKF introduces its... new "HF" Series Bolster

Planning to buy high-speed, heavy-package spinning frames? Then you'll want every spindle equipped with this new, anti-friction bolster.

It carries the heaviest packages—smoothly, without vibration—at highest speeds. Yet it only needs a few drops of oil every 3 or 4 years.

For details, call GArfield 6-6400, or write: SKF Textile Division—Philadelphia, Pa., or Charlotte, N. C.

Specify "SKF-equipped" accept no substitutes

Spherical, Cylindrical, Ball, "Tyson" Tapered and REED Miniature Bearings

EVERY TYPE—EVERY USE
SKF®
SKF INDUSTRIES, INC. PHILADELPHIA 32, PA.

DRAPER BRIEFS
NEWS OF INTEREST IN WEAVING

LOOM GAUGES BECOME NEWS

Mill Goes All-out to Make Looms Competitive by Retraining Fixers

Mill men *know* that their looms give highest efficiency and production when uniform settings of loom mechanisms are established and maintained. They know this means setting looms to gauges. It is a practice we have always advocated—and *NOT NEWS*.

However, like many admirable objectives and despite general acceptance of their value, in actual practice setting to gauges is sometimes most noticeable because of its neglect or omission.

So we think that it *IS NEWS* when a large mill goes all-out to retrain its fixers in setting looms to gauges.

Such an intensive program, by a leading mill, recently came to our attention. Says an official of this mill: "Under present-day competitive price and quality demands, we must set our looms for the very utmost in production and quality.

Though there is one best setting for every part, the chances are, when three men make settings without gauges, we will end up with three different settings. This will pull down our production as well as lower our quality—and no mill can permit that in these competitive times.

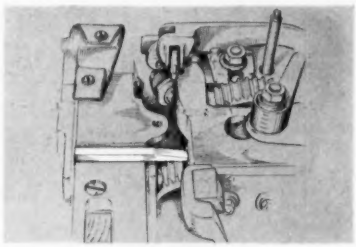
Our aim is to train all our loom fixers in setting the looms to gauge. This is, of course, the best setting to produce quality, efficiency, low up-keep cost, and better running work. It will also reduce any possible areas of disagreement between fixers on the same loom as to whose setting is best."

The mill quickly found that a loom could be set to gauge *if all mechanical parts were in good condition*. Worn parts, or poorly fitting parts, simply could not be set properly. This initiated a second full scale program in the mill: that of overhauling and re-working all looms.

This mill's management believes that the cost of the two co-ordinated programs will be more than returned in the long run, and will produce trained personnel and efficient machinery above the competitive standards of the entire industry.

Accurate loom settings are needed now more than ever before. Higher loom speeds, and more finished surfaces on loom parts make this necessary. Only by setting to gauges can you get full value from your improved Draper looms, mechanisms, and parts.

You can secure full information about Draper loom gauges, suited to your looms, by asking your Draper representative (or writing us) for our Setting Instruction Pamphlets #555 and #555-A. When ordering gauges, specify the loom order number and, when possible, give size of shuttle and throw of crank.



LAY GAUGE

This is a basic gauge upon which many other settings depend.

The extreme forward position of the Lay is established by locating the distance from the Back Box Plate to the Front Horn of the Loomside. Adjust Crank Arm if necessary.

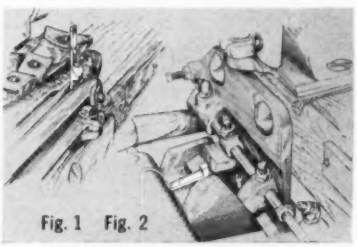
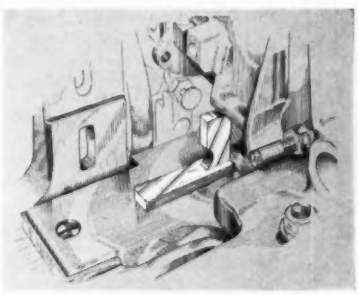


Fig. 1 Fig. 2

FRONT BOX PLATE GAUGE

Figure 1 illustrates Gauge as used to determine space between Shuttle and inside End of Front Box Plate.

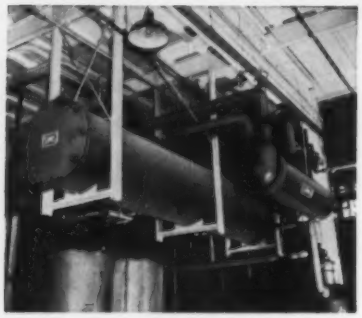
Figure 2 illustrates the Gauge as used to set the Dagger Finger. Gauge shown in position with Shuttle fully boxed and with the thick section of the Gauge between the Frog Steel and the Dagger. Gauge is reversed for Right Hand side of Loom. The adjusting screw is turned until Dagger Finger is set against the Binder.



BATTERY HEIGHT GAUGE (INSIDE)

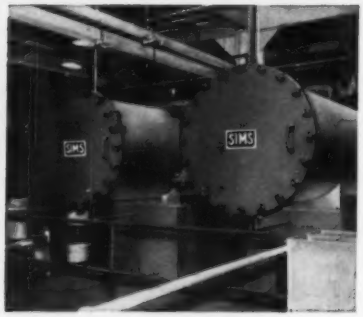
Used to gauge the height of the Hopper Stand over the Lay End.

These 3 FINISHING PLANTS save money with SIMS EXCHANGERS



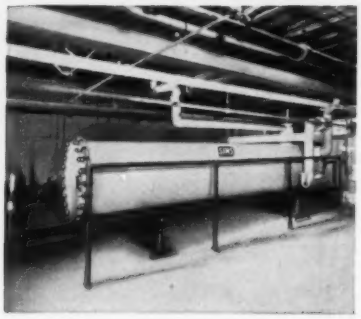
at Pepperell, Ala.

6 large Sims Textile type Heat Exchangers serve bleaching and dyeing ranges and mercerizer. Each waste water exchanger is connected to a Sims booster exchanger using steam to raise temperature of water. Typical of all, is the operation of one, on the dye range, fresh cold water introduced at 72°F. is raised to 136°F. The 6 Sims Exchangers were equivalent to an added 40,000 lbs./hr. boiler.



at Granitville, S.C.

2 very large Sims Textile type Heat Exchangers are fed from a hot waste water collecting tank. An average of 50,000 gallons per hour of incoming fresh water gains 42°F. passing through the exchangers. These 2 Sims Exchangers are floor mounted and serve dyeing ranges and mercerizer to convert waste hot water into usable hot water.



at Clevedale, S.C.

One of 3 Sims Textile type Heat Exchangers serves a mercerizing department. About 250,000 gals. per day of waste water at 175 to 180°F. are passed through this exchanger. Incoming fresh water at 77°F. gained 35°F. at a flow of 172 gallons per minute. Savings on a 24 hour basis amounted to 83,062,500 B.T.U.'s. The 2 other Sims Exchangers operate on bleaching ranges.

Why it's routine to keep a SIMS clean - - -

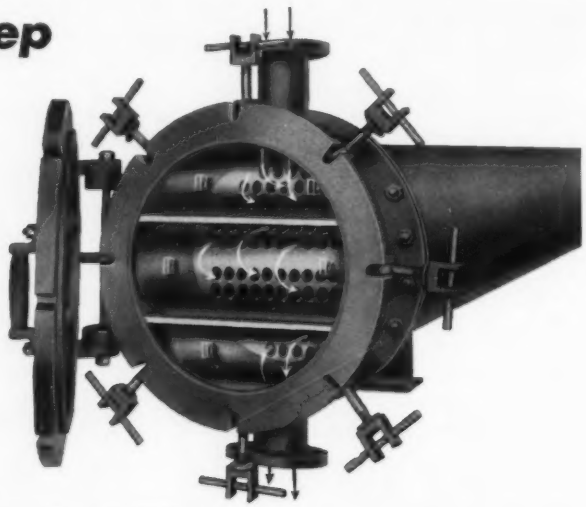
Swinging doors at each end open wide to expose full length of straight-thru 1¼" diameter tubes.

In 30 to 60 minutes a Sims Exchanger can be clean as a hound's tooth and back on the line.

You can be sure a Sims is clean, for you can see it.

There are scores of installations by Sims of Erie in the South for you to see first hand.

Ask for Bulletin TE-4.



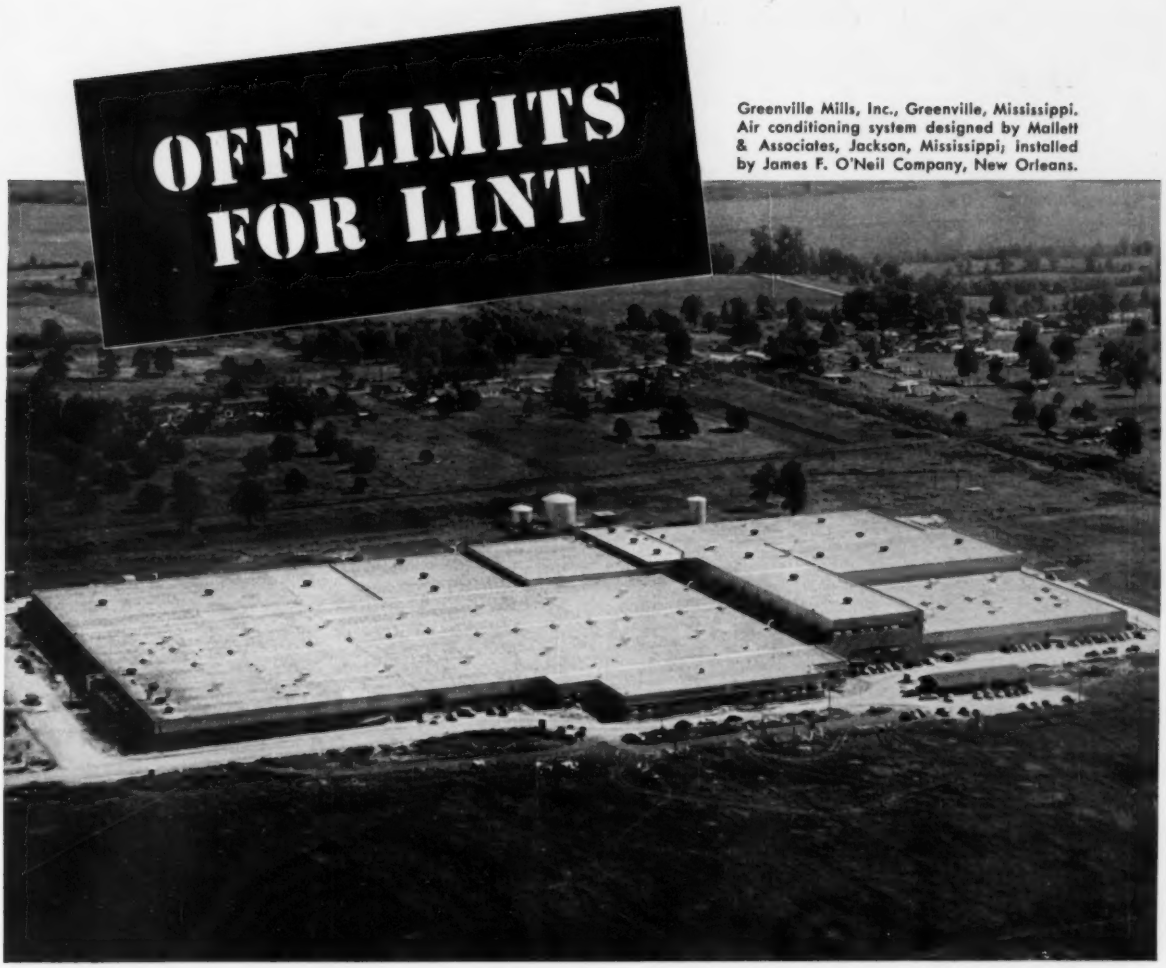
THE SIMS CO.

Manufacturers of Exhaust Gas Boilers • Storage Water Heaters • Heat Exchangers • Feed Water Heaters • Steam Separators

SIMS SINCE 1886

Erie, Pennsylvania

• Quenching Oil Coolers • Oil Heaters • Caustic Soda Recovery Equipment • Commercial type Instantaneous Water Heaters.



Greenville Mills, Inc., Greenville, Mississippi. Air conditioning system designed by Mallett & Associates, Jackson, Mississippi; installed by James F. O'Neil Company, New Orleans.

AAF Auto-AIRMAT filters guard against lint at Greenville Mills plant (a subsidiary of Mohasco Industries, Inc.)

Lint has no way to turn in this modern plant of Greenville Mills, Inc., at Greenville, Mississippi. Wherever it is produced, it is immediately wrapped up by AAF's automatic lint filter—the Auto-AIRMAT. Auto-AIRMATS are installed on 24 air conditioning systems, cleaning 792,000 cfm of air.

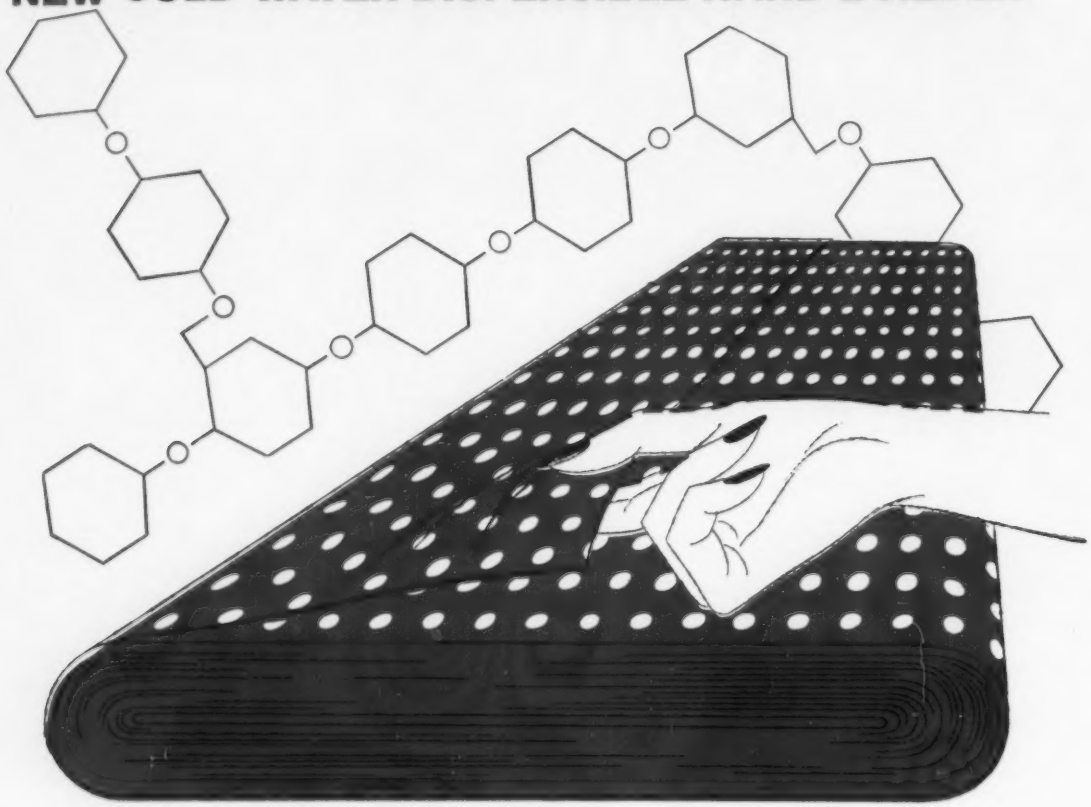
Auto-AIRMAT is the *only* filter designed to remove lint fibres from the air and clean itself at the same time! Airmat filtering material, winding from roll at top of unit, moves automatically down the face of the filter, collecting lint all the way—re-winds into disposable roll at bottom.

If you have a lint *problem*, get the facts on the *lint filter*—AAF's Auto-AIRMAT. Call your local AAF representative or write for Bulletin 234. Address: Mr. Robert Moore, American Air Filter Company, Inc., 275 Central Ave., Louisville, Ky.

AAF American Air Filter
BETTER AIR IS OUR BUSINESS

Kosol

NEW COLD WATER DISPERSIBLE HAND BUILDER



IMPROVES HAND OF WASH 'N WEAR FABRICS

KOSOL is a new kind of hand builder. With a branched chain type structure that cross-links more readily with resins. Clear. Colorless. Gives a new fullness to wash 'n wear finishes.

KOSOL takes only minutes to prepare. No cooking. No cooling. You simply disperse in cold water. Add to resin mixture. Then apply to fabric!

KOSOL is compatible with all resins now in widespread use. It's another development of textile research at National. Try it for that little extra that means so much in fabrics. Write or call your nearest National office.

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National STARCH and CHEMICAL CORPORATION

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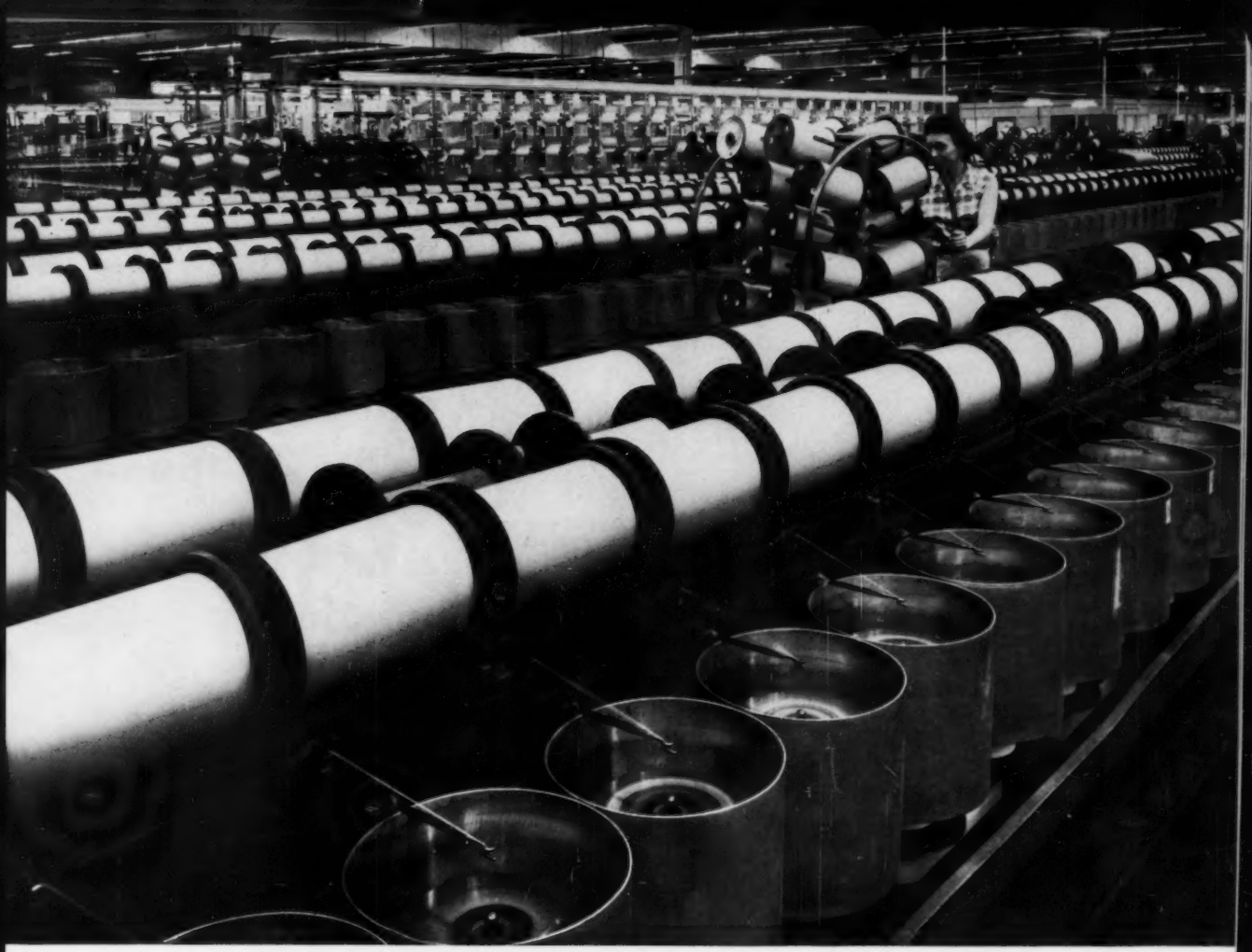

Large packages of Tyrex viscose tire cord revolve on these cord twisting machines in the Painesville, Ohio, plant of Industrial Rayon Corporation. Gulfspin keeps the spindles running smoothly.

Large packages rotate trouble-free with Gulfspin—

GULF MAKES THINGS RUN BETTER!

In the manufacture of its highly successful new Tyrex* viscose tire cord, Industrial Rayon Corporation, Painesville, Ohio, depends on Gulfspin for trouble-free operation of their spindles. Thousands of twister spindles operate 24 hours a day, 365 days a year!

Industrial Rayon engineers report that Gulfspin 41—their spindle lubricant for over 5 years—keeps their busy spindles running clean. Maintenance checks show the spindles to be free from gum, sludge and rust.

May we have the opportunity to demonstrate how Gulfspin can improve *your* spindle lubrication—to help you protect against harmful deposits, minimize problems of heat and vibration, conserve power.

Just call your nearest Gulf office and ask a Gulf Sales Engineer to contact you. Or, mail the coupon for a booklet on Gulfspin.

*Tyrex is a certification mark of Tyrex Inc. for viscose tire yarn and cord.

GULF

GULF OIL CORPORATION
Dept. DM, Gulf Building
Pittsburgh 30, Pa.

Send booklet on Gulfspin.

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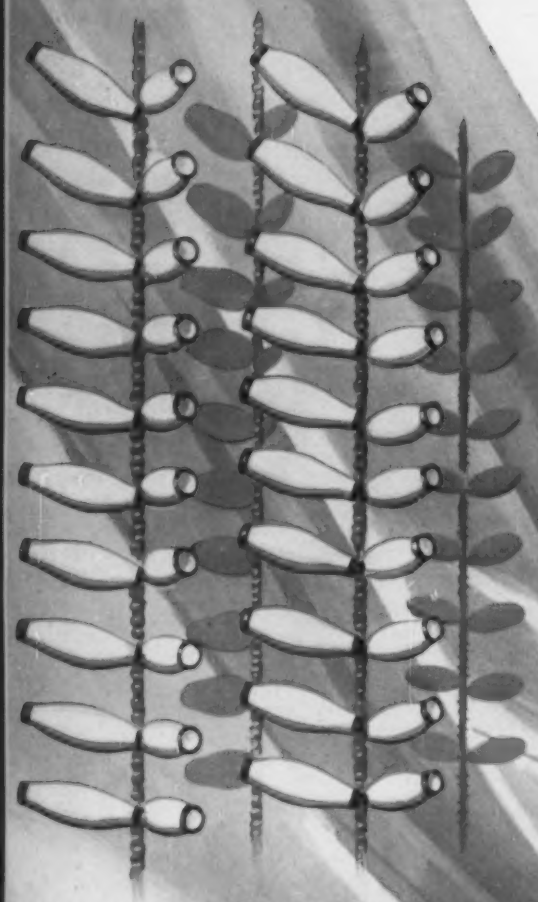
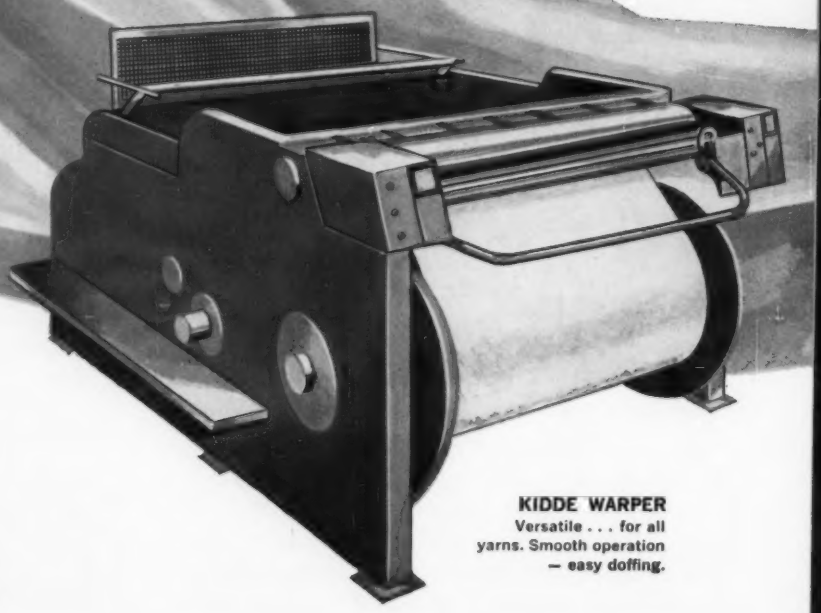
Good fabrics
begin
with good warps...

Good warps are
made on these
Kidde
machines

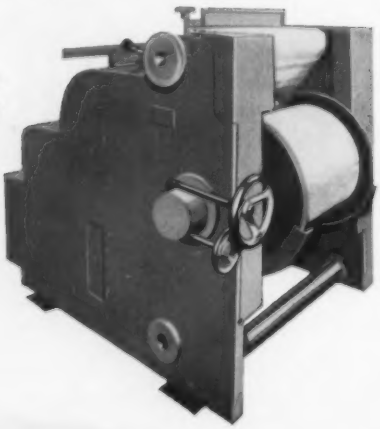


KIDDE CREELS
Custom built to your requirements. Will handle any package made today.



KIDDE WARPER
Versatile . . . for all yarns. Smooth operation — easy doffing.

FOR KNITTING:
Deliver from the Kidde creel to one of the Kidde Tricot warpers (there's one for every size spool). Finish the operation on a Kidde Knitter.

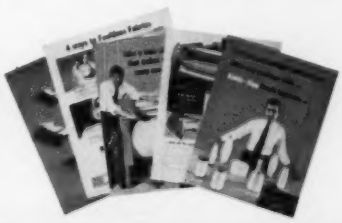


Kidde

KIDDE SLASHERS
For cotton or silk system slashing . . . constructed to meet your requirements.

Here's the formula for good warps . . . Start with any package . . . put it on a Kidde creel . . . deliver it to a Kidde warper . . . run it thru a Kidde slasher. You'll then have the kind of warp essential to the production of top quality fabrics. Of course, the creels, warpers and slashers may be used separately . . . but, for the finest results, maximum versatility and highest production they're designed to work together.

The key to any warping operation is accurate, uniform tension. To set the proper tension for the yarn being run, and for checking it during operation, Kidde Tensometers are essential. There's a full line of them; one is just right for every tension problem.

Want complete information on how to get the most out of your warping operation? Write to Kidde for literature describing the finest equipment made.

TEXTILE MACHINERY CORPORATION — BLOOMFIELD, NEW JERSEY

Now.... a new PERKINS
3-ROLL CALENDER
with many advanced features

High production and better finishing combine with easier operation and lowest maintenance cost to make this all-new Perkins 3-roll calender the "Calender of Tomorrow." Designed and built to give years of trouble-free operation, its many advanced features include:

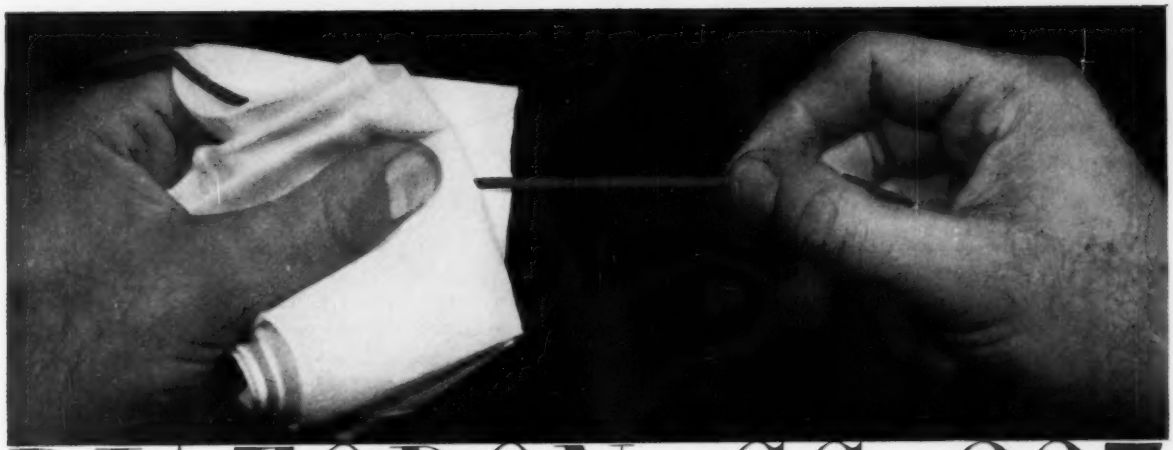
- **Quick removal of intermediate roll without removing cheek pieces**
- **Independent pressure control of both sides of calender**
- **New let-off and wind-up**
- **Heavy welded steel frames and bearing housings**
- **All rolls run in tapered bore bearings for quick removal**

THE WORLD'S LARGEST MANUFACTURERS OF CALENDER ROLLS

B. F. PERKINS & SON, INC.

HOLYOKE • MASSACHUSETTS

new way to improve naphthol crock-fastness



DIAZOPON® SS·837

PREVENTS AGGLOMERATION ■ Diazopon SS-837 affords the naphthol dyer outstanding assistance in improving the fastness to crocking of naphthol dyeings. When used in the dyebath, it keeps the dye finely dispersed. This prevents the deposition of excess color on cellulosic fibers, the principal cause of wet and dry crocking. **ACTS AS SOAPING AGENT** ■ The powerful dispersing and solubilizing properties of Diazopon SS-837 make it an excellent soaping agent for naphthol-dyed stock, yarn and fabrics. In yarn dyeing, it eliminates the need for initial warm soaping because it is active at the boiling point of water. ■ Diazopon SS-837 is a nonionic, almost water-clear liquid, readily soluble even in cold water. It is stable to acids, alkalies and metallic ions. ■ Send for a sample of Diazopon SS-837, and see for yourself how it will improve your naphthol dyeings.

gaf gdc ANTARA

From Research to Reality

GENERAL DYESTUFF COMPANY · ANTARA CHEMICALS
SALES DIVISIONS OF GENERAL ANILINE & FILM CORPORATION
435 HUDSON STREET · NEW YORK 14, N. Y.

SALES OFFICES: New York • Providence • Philadelphia • Charlotte • Chattanooga • Chicago
Portland, Ore. • San Francisco • Los Angeles. IN CANADA: Chemical Developments of Canada, Ltd., Montreal

Diazopon SS-837, manufactured by General Aniline & Film Corp., is sold outside U.S. & Canada under the trade name of "Iguafen® SS-837" by distributors all over the world.

For clearer size, truer colors

. . . in warp sizing and in finishing, use TEN-O-FILM starches.

In warp sizing, TEN-O-FILM starches cook completely in thirty minutes and remain stable through prolonged heating and circulating. Sizing and desizing of all types and blends of yarns may be done at lower temperatures to reduce "bleeding," and permit use of a great variety of dyes.

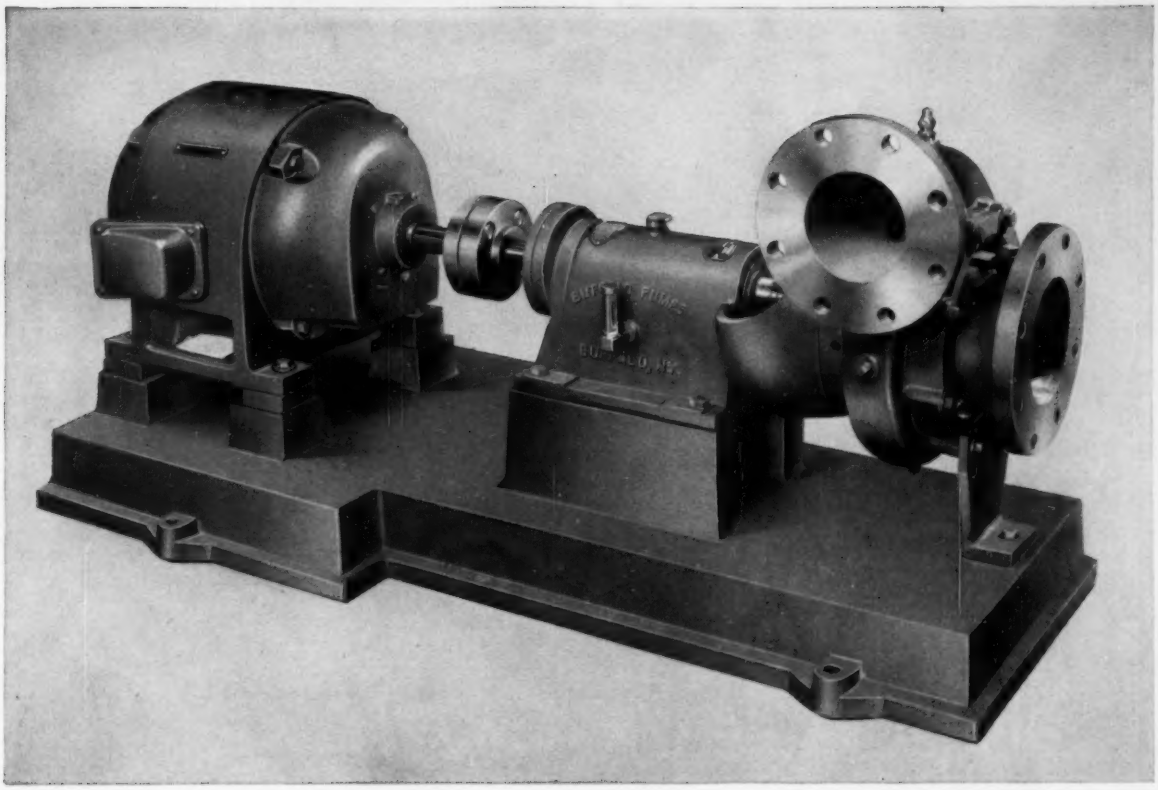
In finishing, the clarity of film produced by TEN-O-FILM is a real advantage. There is no masking of colors in dyeing man-made fibers.

Our technical service group has had wide experience and marked success in adapting this versatile starch to the varied needs of many textile applications. The production advantages and process improvements achieved by TEN-O-FILM can be fitted to your needs by consulting our textile technicians. Contact our nearest sales office or write direct.

TEN-O-FILM® starches

Fine products for the Textile Industry: EAGLE® • FOXHEAD® CLARO® • GLOBE® and TEN-O-FILM® starches • GLOBE® and EXCELLO® Dextrines.

CORN PRODUCTS SALES COMPANY
17 BATTERY PLACE, NEW YORK 4, N.Y.



YOU SAVE ON MAINTENANCE 3 WAYS WITH "BUFFALO" SINGLE SUCTION PUMPS!

1. Easier Accessibility to Inner Working Parts Cuts Servicing Time:

Open design mounting bracket allows quick access to stuffing box for gland adjustment.

Renewable wearing rings protect casing from wear. Rings only (not casing) need be replaced.

2. Interchangeability of Parts Thru Standardization of Parts Further Decreases Maintenance Costs:

Lower parts inventory costs and stocks.

Simplified, less costly inventory control.

3. Rugged "Buffalo" Construction Assures Long, Dependable Life & Minimum Maintenance:

Full ball bearing construction means long bearing life.

Long **overall** life is provided by oversize shafts, bearings, stuffing boxes — heavy-duty casings, stands.

"Buffalo" Full Ball Bearing Single Suction Pumps are tops in efficiency with rock bottom maintenance costs. For the full story, call your "Buffalo" engineering representative or write for Bulletin 976-G.

Many Applications For "Buffalo" Single Suction Pumps:

- General water supply systems.
- Corrosive & non-corrosive liquids.
- Saturated liquids and refrigerants.
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"Buffalo" PUMPS

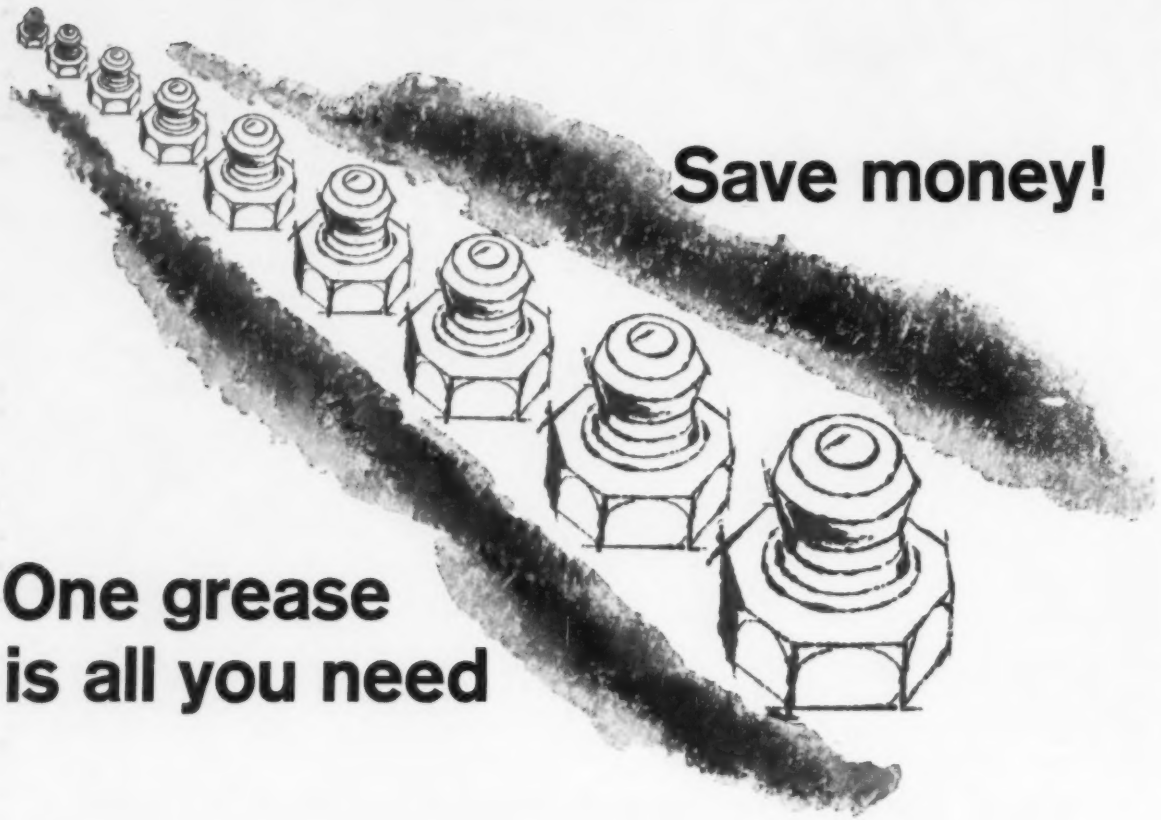
BUFFALO PUMPS

Division of Buffalo Forge Co.

175 MORTIMER STREET BUFFALO, N. Y.

Canada Pumps, Ltd., Kitchener, Ont. Sales Representatives in all Principal Cities

A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID



Save money!

One grease is all you need

If you use several greases to lubricate your plant equipment—stop! You'll save money with Sinclair Litholine® Industrial Grease because this one grease simplifies inventory, saves time. Recommended for all types of bearings. It has also earned an enviable reputation for high temperature bearing performance and mechanical stability. When management asks how you've cut costs, tell them you've switched to Sinclair Litholine and show them the results.

Find out how Litholine can help you. Call your nearest Sinclair Representative, or write for free literature—Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. There's no obligation.

Sinclair

Litholine® Industrial Grease

A colorful conclusion for woolens . . . Amacid* and Chromaven* Dyes

Capture the spirit of the season with all your woolen goods . . . use AMACID and CHROMAVEN DYES. Available in a complete range of lively hues, Koppers select dyes are fast to sunlight, washing, perspiration and dry cleaning. You'll find, too, that these dyes are easily applied, and that they meet specific color demands for every type of wool dyeing—yarn or piece goods. So specify AMACID and CHROMAVEN DYES and get the color treatment you want . . . prize woolens dyed to stay vibrant.

For more information or technical assistance, get in touch with your nearest Koppers representative. Our laboratory facilities are always at your disposal.

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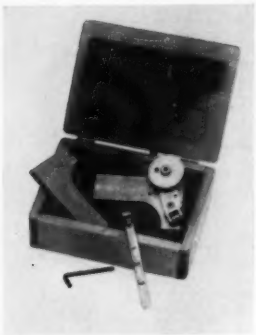
ANNOUNCING

OUR NEW

PRECISION JEWEL BOX



THE ANSWER TO A MILL MAN'S PRAYER

Our New Equipment For Aligning Stands: For Maintenance of Precision Machinery.

Fits Any Type Frame Without Dismantling: Without Cutting The Ends Down.

Will Align Stands to Within .002" Speedily. Experience Has Shown That This New Design Takes Less Than One Hour to Align Stands On The Average Spinning Frame. Available Now.

PRECISION WORKMANSHIP. . . QUALITY PRODUCTION

Install Full Anti-Friction High Draft Spinning. NYAF "39" Is Superlative.

THE NYAF "39"

- Air Flow Creel with ball bearing bobbin holders.
- Full Anti-Friction case-hardened gearing, inside and out.
- Positive weighted, positive center-suspended *Saddle hinged from heavy duty ¾" diameter cap bar rods.
- Positive positioned anti-friction top rolls with proven Fafnir bearings.
- Rugged stands. Fully adjustable. Designed to stay clean.
- Precision, induction-hardened bottom fluted and knurled rolls. Full anti-friction. Tolerances. .002 maximum run-out. Guaranteed diameters .0015.
- High control cradle design with pin* for positive close adjustments.
- Positive weighting.
- Pressed steel or aluminum Ring Rails.
- Flip-back Node control Rings.
- Full anti-friction oil-less Spindles.
- Full anti-friction Idlers & Cylinders.

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NEWS IN BRIEF

Ike Asks Funds for Textile Data. President Eisenhower has asked Congress to provide $200,000 from Census Bureau funds for special industrial and statistical analyses for the use of the new Interagency Textile Committee.

Flame-Retardant Cotton. An Air Force-sponsored investigation of new methods for imparting flame resistance to cotton fabrics is described in a report just released

for industry use through the Office of Technical Services, U.S. Department of Commerce. The investigation was concerned primarily with the chemical attachment of phosphorus-containing groups to cellulose. Copies of the report are available from OTS, Washington 25, D.C., for $1.75. Ask for PB 151550.

What Women Want in a Dress. Housewives say that what they want most in a dress is ability to hold shape, resistance to wrinkling, and color-fastness, according to a recent U.S. Department of Agriculture survey. The women interviewed considered amount of shrinkage and ease of cleaning to be particularly important for street dresses, and color and appearance of weave to be particularly important for dresses for special occasions. A free copy of the study, Marketing Research Report No. 338, may be obtained from the Office of Information, USDA, Washington 25, D. C.

Canadians Suffer Too. Even typical Canadian souvenirs such as British Columbian totem poles and Eskimo sculpture are feeling the pressure of Japanese competition, says the Canadian Apparel & Textile Manufacturers Association in pointing up the plight of its own members. According to figures cited by CATMA, if Japanese producers continue to ship textiles and clothing to Canada at the January-May rate, they will have shipped the "staggering" total of $48 million worth by the end of the year—almost twice as much as in 1958.

New Stretch Yarn. Burlington Industries has been assigned U. S. patent 2,890,567, for a new type of stretch yarn which combines thermoplastic and nonthermoplas-

Labor-Management News

UTWA Plans Ala.-Ga. Drive. Officials of United Textile Workers of America met recently in At-

lanta and announced plans for stepped-up organizing drives in Georgia and Alabama textile mills.

Seek One-World Work Loads. Textile unions throughout the Western World are aiming at an equalization of work loads from country to country, according to Solomon Barkin, research director for Textile Workers Union of America, writing in a recent issue of *Monthly Labor Review*, publication of the U.S. Department of Labor.

Henderson Charges Dismissed. National Labor Relations Board has dismissed charges of unfair labor practices filed against Harriet-Henderson Cotton Mills by Textile Workers Union of America. The union announced that the decision would be appealed.

Dyers Get Wage Hike. About 1,000 skein dyers in five Philadelphia plants and three New York City plants have won 12½-cent hourly raises for each of the next two years, plus fringe benefits, in new contracts negotiated with the employers by Textile Workers Union of America.

FOR SAFER BUSINESS FLYING...

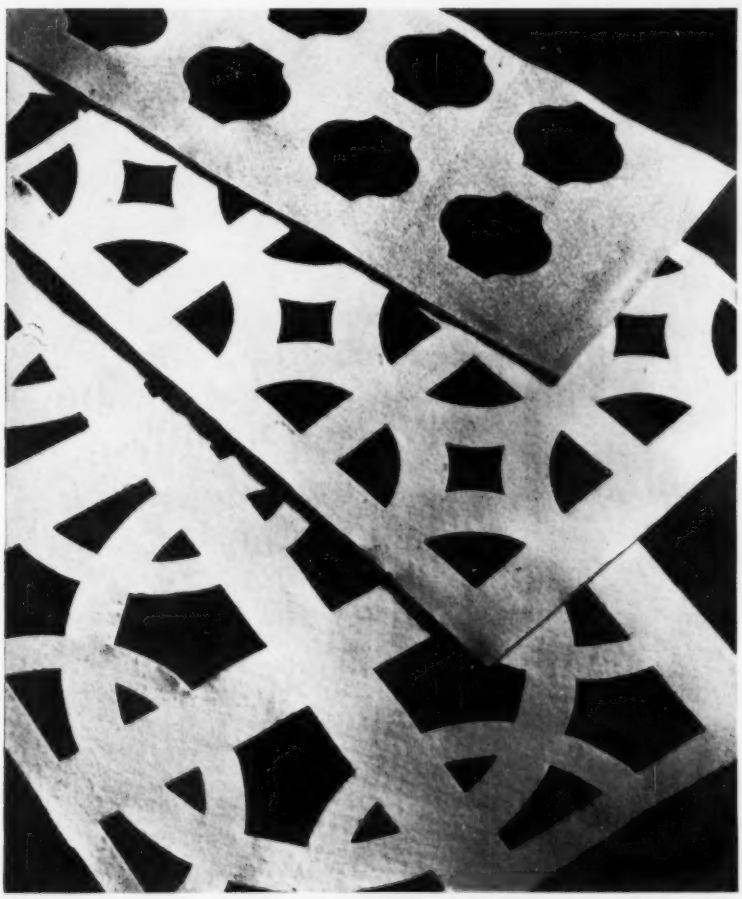
Whatever the weather . . .
have the confidence that comes only with
seeing-eye safety
RCA AVQ-50 Weather RADAR
leads you safely around thunderstorms

SOUTHERN AIRWAYS COMPANY
Radio & Electronics Department
ATLANTA AIRPORT ATLANTA, GEORGIA

For Information & Estimates: W. M. LENTZ, Mgr. POPLAR 7-1556

Complaints by residents of Sarasota, Fla., of hydrogen sulfide fumes escaping from the city's sewage treatment plant were met by installation of the Dacron fabric baffle shown above. The fabric traps the fumes, which are then released through a 75-foot stack. The baffle is suspended by Dacron ropes from a geodesic cover of hexagonal aluminum panels.

Sportswear of Pendleton Woolen Mills' fabrics was included among the uniforms worn by guides (couple at the left) at the U.S. exhibition in Moscow's Sokolniki Park last month. At the right are Mr. and Mrs. C. M. Bishop, Jr., of the West Coast woolen firm.



Cur- .. patterns, designed by Edward Durell Stone in a felt-like drapery fabric of Dacron and rayon, are being merchandised by S. M. Hexter. The fabric is called "Feutron."

tic yarns. In the process such yarns as nylon or Dacron are plied with cotton or other nonthermoplastic yarns. The plied yarns are then twisted, heat-set, and back-twisted.

New Green for Army Officers. The Army has approved a lightweight fabric in Army Green (Shade 44) as an optional material

for male officers' winter service uniforms. The fabric is 60% polyester fiber, 40% wool, in a gabardine construction, and weighs about 10½ oz/yd.

Institute Up-Dates Name. Canada's Silk & Rayon Institute has voted to change its name to Man-Made Fibre Textiles Institute, to make the title more representative of present industry activity.

Control panel of automatic Recrystallizer plant. Photograph by Loebel.

International discovers new purification process...brings automation to salt refining

Last fall, after more than a decade of research, International Salt Company perfected the first new method of salt refining in over 150 years. This process has as its basis one of the most unusual facts in industrial chemistry: The major impurity in salt crystallizes out of solution as the temperature rises . . . while salt itself crystallizes out as the temperature drops.

In International's new process, a slurry of salt and brine is heated to 225°F. The salt goes into solution, and impurities (which remain undissolved) are separated out. Then the brine is flash-cooled to 140°F. Now pure salt crystallizes and is filtered out while any remaining impurities go into solution.

This process makes possible, for the first time, continuous, automatic refining of salt. With one man in control, International's new Recrystallizer at Avery Island, La., produces high-purity salt in one-third the time of conventional purification.

The scientific skill and research facilities that provided this "step ahead" are also at the service of any salt-using company. Contact International Salt Company, Inc., Scranton 2, Pa., or any of the offices listed below.

STERLING SALT . . . product of INTERNATIONAL SALT CO., INC.

First in salt technology . . . . first in salt for industry

Boston, Buffalo, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Newark, New Orleans, New York, Philadelphia, Pittsburgh, St. Louis

Cone Mills, Inc., is using these billboards in the South and on the West Coast in a three-year program to promote its "Task Force" fabrics—twill, denim, and chino—for work clothes.

Accident Facts. The 1959 edition of "Accident Facts," the National Safety Council's statistical yearbook, is now available. Several sections of the 96-page publi-

cation are devoted to industrial accidents, and provide a comprehensive background for an industrial safety program. Copies are available from the Council at 425 N. Michigan Ave., Chicago 11, Ill.

Textile Stamp. Petitions in favor of issuance of a commemorative postage stamp honoring the American textile machinery industry as founder of the American factory system have been signed by 48 senators, representing states from New England to California, and sent to the postmaster-general. They suggest that the stamp be issued to coincide with the opening of the American Textile Machinery Exhibition-International at Atlantic City next May 23.

Cotton Gains Ground. Cotton scored small competitive gains during 1958 in apparel and industrial uses and held its ground in the household market, according to the 1959 edition of "Cotton Counts Its Customers," just released by the National Cotton Council. The Council reports that nearly 7.7 million bales of raw cotton were consumed during 1958 in about 400 end uses covered. Major uses, in order of size, were men's and boys' trousers (723,000 bales), men's and boys' shirts (620,000 bales), sheets (443,000 bales), towels and toweling (372,000 bales), and drapery and upholstery fabrics (347,000 bales).

Sock With a Pocket. Charles H. Bacon Co. has been assigned U.S. Patent 2,890,461 for a bobby sock

with a pocket. The pocket fits inside the cuff and has a flap closed by a snap fastener.

Method for Dulling Nylon. Grove Silk Co. is the assignee of U.S. Patent 2,897,577, for giving a dull or matte finish to nylon and other synthetic fibers through the use of diatomaceous earth, silica powder, and similar materials.

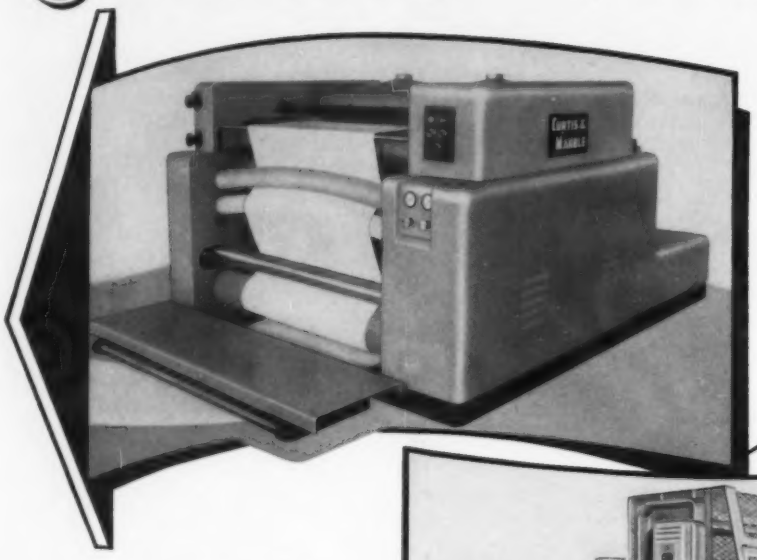
Navy Designs Stratosphere Clothing. A new U. S. Navy lightweight, insulated high-altitude garment works on the Thermos bottle principle. It consists pri-

marily of two rubberized fabrics coated with a very thin aluminum film and arranged so that a spring-like plastic spacer holds the two fabrics apart. The aluminized surfaces provide excellent insulation and reduce heat transfer by radiation. The material is said to have about the same insulating value as conventional fabrics or furs, with only about half the weight.

A new electric membrane demineralizing plant, for removing salts and minerals from brackish water by ionization, uses these sheets of dynel. Each desalting unit is built around 150 sheets of the fabric, shown here being assembled, which are alternately treated with negatively and positively charged resins. Units can be stacked to increase capacity or to handle higher salt concentrations, at a cost of 20 cents to $1 per 1,000 gallons.

Sweden to Promote Cotton. The Swedish cotton textile industry has established a cooperative program

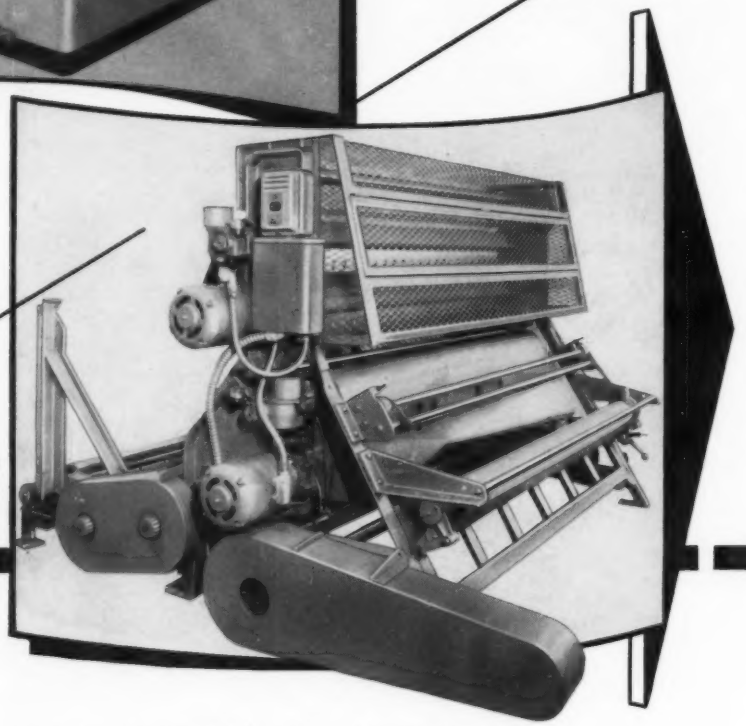
One way - or the other...



there's nothing better made than . . . .

the M-125 Horizontal Shear

or . . . the AV Vertical Shear



Yours is the choice between these two outstanding shears for sheer perfection! Let us help you modernize your Cloth Room for greater efficiency with particular emphasis on better quality. Shears such as these are the basis for your start.

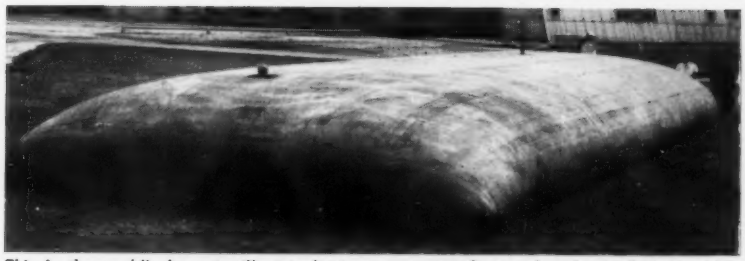
Manufacturers of a complete line of Dry Finishing Machinery

CURTIS & MARBLE MACHINE CO.

72 CAMBRIDGE STREET • WORCESTER 3 • MASSACHUSETTS

SOUTHERN SALES & SERVICE • LAURENS ROAD • GREENVILLE • SOUTH CAROLINA

ESTABLISHED 1831



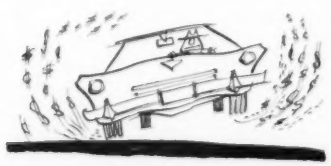
This is the world's largest pillow tank—it measures 64 feet in length, 24 feet in width, weighs about a ton when collapsed, and has a rated capacity of 50,000 gallons—used for storing bulk liquids. It was developed by Goodyear Tire & Rubber Co. The tank is made of synthetic-coated nylon, and the first one produced is used by the army for fuel storage.

with Cotton Council International —the 14th such program to be started since the National Cotton Council's overseas counterpart began operations four years ago.

Express Rates Reduced. Railway Express Agency has posted new "incentive tariffs," providing for substantially reduced rates on individual prepaid small shipments of specified commodities when picked up in bulk lots of 300 pounds or more at one time from one shipper at various origin points. Rugs, carpets, and tufted textile products are among the commodities covered for the first time. As an example of the new rates, ten small shipments totaling 325 pounds and moving from New York to ten different destinations

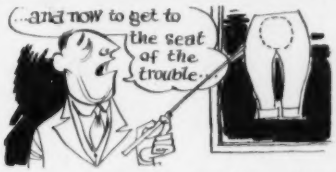
throughout the country showed savings of 37.1% over the otherwise applicable express first-class rates as of the effective date of the incentive tariffs.

Mileage Payments Up. Mileage payments to textile industry salesmen driving their own cars on company business reached a na-



tional average of 8.76 cents per mile this year, according to Wheels, Inc. The national average for all industries is 8.91 cents.

New Courses at PTI. Philadelphia Textile Institute's Evening School is now offering a five-year credit diploma program in business administration, in addi-



tion to courses in textiles, chemistry, basic science, plastics technology, and industrial psychology. Special courses being offered this year include a 24-week program in apparel manufacturing for the men's clothing industry.

Merchandising Notes

Allied Chemical recently completed a wear test of the principal carpet fibers—for the test a huge carpet was laid on the floor of New York's Pennsylvania Sta-

tion. During the two-month test, the carpet was walked on by nearly two million people. The carpet measured 40′ X 32′, and was woven in 8-foot strips, each containing a different fiber in the pile.

Burlington Hosiery Co.'s Jerks Socks division is offering king-size socks in sizes up to 16. Size 13 is normally the top in men's hosiery.

William Carter Co. has expanded its line of 80% Orlon, 20% cotton knit fabrics to include children's knit underwear.

Chemstrand Corp. will include the Better Hosiery Council Seal of Approval in its advertising and promotional programs on behalf of the men's and boys' sock and anklet manufacturing industry.

Esquire Socks are now in production of men's half hose in 100% Acrilan—first such application of the fiber.

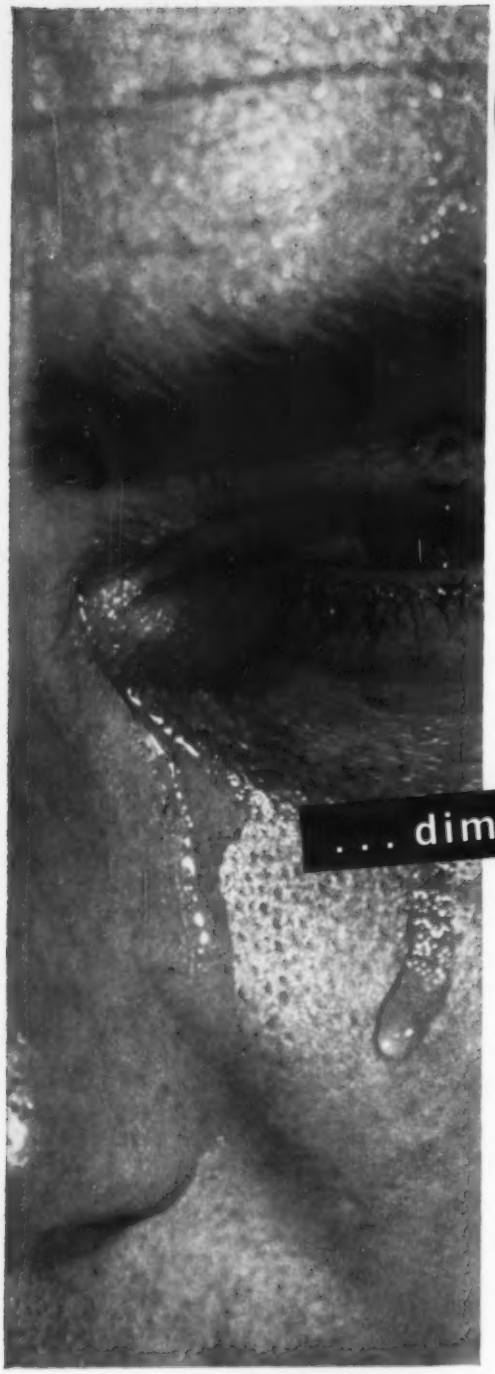
Industrial Rayon Corp. is extending its carpet nylon program to the consumer level with ads in mass-circulation magazines. The first ad will offer 3″ X 5″ swatches of carpet.

Leath, McCarthy & Maynard are offering full-fashioned and seamless nylon hosiery with Morpul top.

Archibald Holmes & Son have announced that their carpets are now available to businesses, institutions, and individuals on a rental basis, through arrangements set up with the American Industrial Leasing Co. Carpets are rented for five years; monthly rental for the first three years is $30.50 per $1000 of total cost. Fourth and fifth year rental is paid in advance by an 11% deposit at beginning of lease. After five years, rental may continue for 1% of original invoice price per year. Minimum installed value of carpet is $1500.

McCampbell & Co. has introduced a new line of fine-yarn Bondyne fabrics for dresses, blouses, skirts, and shirts for spring of 1960. The fabrics are four-yard blend of 70% Avron high-strength rayon and 30% dynel.

Virginia Fibre Corp. is producing a permanently nonflammable casement and drapery fabric with a warp of Rovana (saran microtape) and a filling of Verel and Coloray.



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While imparting high quality crease and shrink resistance, Crown's C-TRON resin solves formaldehyde odor-problems . . . both in the processing plant and in the finished fabric. Its extremely low free formaldehyde content has enabled many plants to eliminate the afterwash process entirely!

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RECENT TECHNICAL AND COMMERCIAL DEVELOPMENTS

by J. B. Goldberg
Consultant to the Textile and Allied Industries
Exclusive

FIBERS AND YARNS

"Zantrel" Polynosic Fiber. Hartford Fibres Co. announces plans to produce "Zantrel" high-modulus cellulosic fiber under licensing agreement with Societe Chimiotex of Switzerland. Report development of "polynosic" fiber by French C. T. A., Belgium's Fabelta and Societe de Viscose of Switzerland under Japanese patents. Burlington Industries will offer fabrics containing original Belgian "Z-54" fiber this fall. Staple to be made by Hartford Fibres in 1, 1½, and 3-denier sizes priced at 47c-50c per lb.

Production of Special Rayon Yarns. Japanese Toho Rayon Co. receives patent on apparatus to make yarn of variable denier by special supply means, extrusion device, and means for varying pressure.

High-Bulk Filament Yarn. British Celanese, Ltd., was the recipient of a recent U. S. Patent for producing a bulked yarn of an acetone-soluble vinylidene chloride-acrylonitrile copolymer by stretching the yarn while softened by heat, then relaxing to allow at least 5% length shrinkage, subsequently washing and drying the filaments.

Vinal and Polyester Yarns in Tires. One Japanese rubber firm reports successful use of polyvinyl alcohol (vinal) yarn for tires, claiming twice the durability and less affected by water than rayon cord tires. Resistance to heat and extensibility said to be superior to nylon with price competitive. In this country, the Firestone Tire & Rubber Co. announced that experiments with polyester yarns in tires indicated performance equal to nylon with flat-spotting eliminated.

Low - Denier Polypropylene. Reeves Bros. announces first commercial low-denier polypropylene yarn and staple. Filament denier range is 3 to 22. While this company has been producing monofilament yarns for some time, it is anticipated that the availability of multifilament yarns and staple will greatly expand textile applications. The fine denier yarn and staple are being produced at Saxon Mill, Spartanburg, S. C.

MACHINERY AND PROCESSES

Yarn Texturizing Process. In England, Ernest Scragg & Sons, Ltd. announced a new single-cycle process for modifying nylon and polyester yarns. The yarns are not false-twisted and are said to be of the non-torque type with 50% greater covering capacity than that of woolen yarns of the same weight. Claims are made for softness, absorbency, resilience, low stretch, excellent dye affinity, and complete dimensional stability. Delivery packages are said to be suitable for package dyeing. "Astralene C" and "Astralon C" are names to be used to identify processed yarns of polyesters and polyamides, respectively.

Making Paper Yarn. R. Marks, Dallas, Texas, has received a patent on a process and apparatus for the continuous production of a twisted paper yarn.

Dry Sizing Machine. The Swiss Ruti A. G. has exhibited a dry sizing machine which features reduced floor space requirements and is said to be particularly suitable for sizing delicate synthetic warps. The sizing is applied while warm in a molten condition with an air blast against the feed roller controlling the amount of material picked up. Details are disclosed in British Patent 814,769.

FABRICS AND FINISHES

Glued Suits. A new technique developed in the U.S.S.R. is being used to produce suits in East Germany with glued lapels, shoulder pads, and linings. A mechanical press has also been designed and is expected to be available next year. It is anticipated that a similar method may be used in the future for all seams.

Durable Antistatic Agent. Farbwerke Hoechst A. G. is marketing a water-soluble product, "Arkostat P" as a durable antistatic for synthetics. Featured is storage life of three months and solution stability with the catalyst of 6-8 hours. Fastness to 15-20 light washings with conventional deteregents at 40-50 C is claimed, but finish is not resistant to machine washings or washing at the boil.

German Bonded Fabrics. Said to be produced on a machine capable of replacing 12 looms, "Skelon" fabric intended for outerwear is a felted combination of wool and rayon. The mixture is fed into the unit in the form of two slivers and wool threads are laid across between them. The tow and threads are then run through a felting machine. "Floretta" is described as another bonded material suitable for linings, curtains, and packing material. It is made by spraying a resin solution on a cotton sliver, pressing, and oven-drying. Full-scale plant is to be ready next year with output of 27 million square meters scheduled for 1961.

Fabric Conditioner for Home Laundering. Du Pont's "Zelcon C" is said to make home laundered fabrics soft and fluffy. It is reported that the moisture absorbency of terry toweling is increased from two to three times over that of unconditioned toweling by laundering with this product which is now available.

Sales upped 400% since Pogrelis-Meyer, Inc. started Heller Factoring

"Pretty Maid" casual wear was making many misses happy, but the Pretty Maid line presented problems to Harry A. Meyer and Ben B. Pogrelis; their company needed growth capital. That is why, in March, 1951, Pogrelis-Meyer Inc. became a Heller factoring client.

Since then, with the help of Heller service and counsel, the partners have been free to devote their energies to styling, producing and merchandising. Bad debt losses were eliminated, and so were the clerical expenses of credit, collection and accounts receivable departments. Capital has always been available and it turns over faster, does more work, earns more. Buying has been advantageous. Overhead has been spread by pre-season production in this seasonal business. A bigger slice of the market has been won — a 400% sales increase since Heller service began.

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EXECUTIVE VIEWS

Dynamics of textile management

by Jack C. Werner
Werner Textile Consultants

Exclusive

FUNDAMENTAL changes in the area of textile management which have taken place over the past decade and are steadily gathering momentum have consistently remained in the background of public opinion, because they have been inadequately discussed, explained, and understood, even among some segments of the textile industry itself.

Understandably, the progress made in machinery, equipment, and fiber and fabric development attracts more attention than the seemingly less spectacular, but in reality very profound strides made by management. The nature and purpose of the products, be they the results of new processes, new blends, or new applications, requires widest possible exposure to the public through advertising, publicity, and promotion. So should the less apparent activities of management in planning, developing, and implementing new techniques and methods.

At present, the image created of the textile industry as a whole lacks appreciation for the vital role management plays in the successful discharge of its responsibilities. As a result the industry fails to attract the number and kind of people for whom ample and rewarding opportunities exist.

HAND IN HAND with this deficiency goes the fact that though the functions and tasks of management have undergone fundamental changes, it is only recently that the educational facilities are beginning to meet the needs created by these changes. However, at the present time there is still a dearth of the "new-type" professional manager and there are only limited educational facilities to help produce himee.

If we are to draw a profile of this new textile manager, we see that a good many ingredients have gone into his making. Modern textile management is rapidly moving away from the old concept of basic production orientation and toward a much broader base, that recognizes the consumer of textiles as the anchor of all management decisions. We are no longer content to produce high quality goods at the lowest possible price and let someone else worry how and where they can be sold profitably.

Secondly, we are gradually moving towards "corporate management" of textile enterprises and away from family-held companies. This necessitates a new concept of professional management versus owner-management structure of companies. It involves also a fresh look at executive compensation and executive development programs.

Related to it is the fact that the "one-man" rule of textile companies is slowly disappearing and group management is taking its place. An entirely new set of skills and understanding of the interrelationship of management functions have become essential to the effective operation of such a management.

Finally, rugged individualism is slowly giving way to an attitude of enlightened cooperation between individual companies in the industry in matters of basic problems concerning the welfare of our entire industry.

THE SIGNPOSTS of these changes are all around us, and yet rarely understood in the over-all context of their meaning. They are reflected in the dynamic changes of the organizational structure many textile firms have undergone in recent years. If one compares the organizational structure of a company 10 years ago and that under which it is functioning today, these changes become clearly evident. They show the increasing emphasis that is being placed on the marketing functions and its related activities such as product development, customer services, technical assistance, the proper integration of these functions, and the emerging idea of grouping all administrative functions under one

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EXECUTIVE VIEWS

(from page 107)

executive. They will also indicate the importance placed upon providing vehicles for group thinking through management committees at various types, and the concern with Industrial Relations, Public Relations, and sometimes Stockholders' Relations.

This emphasis on certain new functions of modern management brings in its wake the emergence of the professional manager who can weld a successful team out of production, marketing, financial, administrative, and personnel executives. This is the man of broad background who is oriented toward definite organizational objectives, and long-term planning objectives, and who can direct the necessary resources toward their attainment. He belongs to a new breed of men who are gradually arriving at the top and medium management levels of our industry.

The election of Everett Drake as president of M. Lowenstein & Sons is a case in point. There are many others who are emerging into positions of great responsibility on all levels of executive action. What is more important is the fact that companies large and small are setting up their own management development programs.

Philadelphia Textile Institute is setting up an executive-level education program which will award degrees in marketing and management. The University of North Carolina is giving a management-development course which has attracted considerable support from the industry in North Carolina. A sizeable number of potential management personnel has been sent to these courses by smaller mills. North Carolina State College, School of Textiles, is sponsoring a conference designed to improve managerial capacity.

These programs and courses are given in direct response to the awareness expressed by textile industry leaders for developing a new generation of textile executives. While they answer to some degree the needs of modern management for well trained, well-versed executives, in line with the

Continued on page 239

FUTURE EVENTS

Date		Event	Location
Oct.	1-2	Textile Quality Control Association	Grove Park Inn Asheville, N. C.
	3	Textile Operating Executives of Georgia slashing and weaving discussion	Georgia Tech Atlanta, Ga.
	7	Chemical Finishing Conference	Mayflower Hotel Washington, D. C.
	7-10	AATCC national convention	Sheraton Park and Shoreham Hotels Washington, D. C.
	8-9	Southern Textile Methods and Standards Association	Clemson House Clemson, S. C.
	8-9	North Carolina Textile Manufacturers Association convention	Carolina Hotel Pinehurst, N. C.
	10	Alabama Textile Operating Executives carding and spinning discussion—9:30 A.M.	Langdon Hall Auburn, Ala.
	10	South Carolina Div., Southern Textile Association 10:00 A.M.	Clemson College Clemson, S. C.
	10	Southern Textile Overseers Association	Greenville, S. C.
	15-16	Quartermaster Association annual national convention	Hotel Statler-Hilton New York City
	16	Metropolitan Section AATCC	Kohler's Swiss Chalet Rochelle Park, N. J.
	16	Northern New England Section AATCC	Lexington Inn Lexington, Mass.
	17	Textile Education Foundation, Inc.	Georgia Tech Atlanta, Ga.
	17	Northern North Carolina-Virginia Div. Southern Textile Association, 10:00 A.M.	Y.M.C.A. High Point N. C.
	19-23	Goodrich Chemical Exhibit	Sheraton-McAlpin Hotel New York, N. Y.
	19-23	National Safety Congress and Exposition	Conrad Hilton Chicago, Ill.
	23	Delaware Valley Section AATCC	Kugler's Restaurant Philadelphia, Pa.
	23	Rhode Island Section AATCC	Prov. Eng. Soc. Providence, R. I.
	23	Western New England Section AATCC annual meeting	Rapp's Restaurant Shelton, Conn.
	27	Institute of Textile Technology technical advisory committee and board of trustees	I.T.T. Charlottesville, Va.
	31	Eastern Carolina Div. Southern Textile Association	N. C. State College Raleigh, N. C.
Nov.	7	Mid-West Section AATCC	Bismarck Hotel Chicago, Ill.
	18	Tufted Textile Manufacturers Association interim workshop	Chattanooga, Tenn.
Dec.	5	Piedmont Div. Southern Textile Association, 9:30 A.M.	Johnston Memorial Y.M.C.A. Charlotte, N. C.
	5	Southeastern Section AATCC	Atlanta Athletic Club Atlanta, Ga.
1960			
Feb.	8-9	National Cotton Council annual convention	Dallas, Texas
Apr.	7-9	American Cotton Manufacturers Institute convention	Americana Hotel Bal Harbor, Fla.
May	23-27	American Textile Machinery Exhibition	The Auditorium Atlantic City, N. J.
May 31-June	2	Cotton Research Clinic	Grove Park Inn Asheville, N. C.
June	23-25	Southern Textile Association annual convention	Grove Park Inn Asheville, N. C.
Oct.	3-7	Southern Textile Exposition	Textile Hall Greenville, S. C.

J. A. Pitts, Assistant Overseer of Spinning at Chiquola Manufacturing Company, Honea Path, S. C., checks yarn quality with Armstrong representative, Taylor Weaver.

Your Armstrong man can help you get top production from your spinning frames

For top production, in quality and quantity, your spinning frames need cots that are specially suited to the frame and fiber. And your Armstrong man can help you select the right cot for your work from the wide variety of Armstrong Accotex materials.

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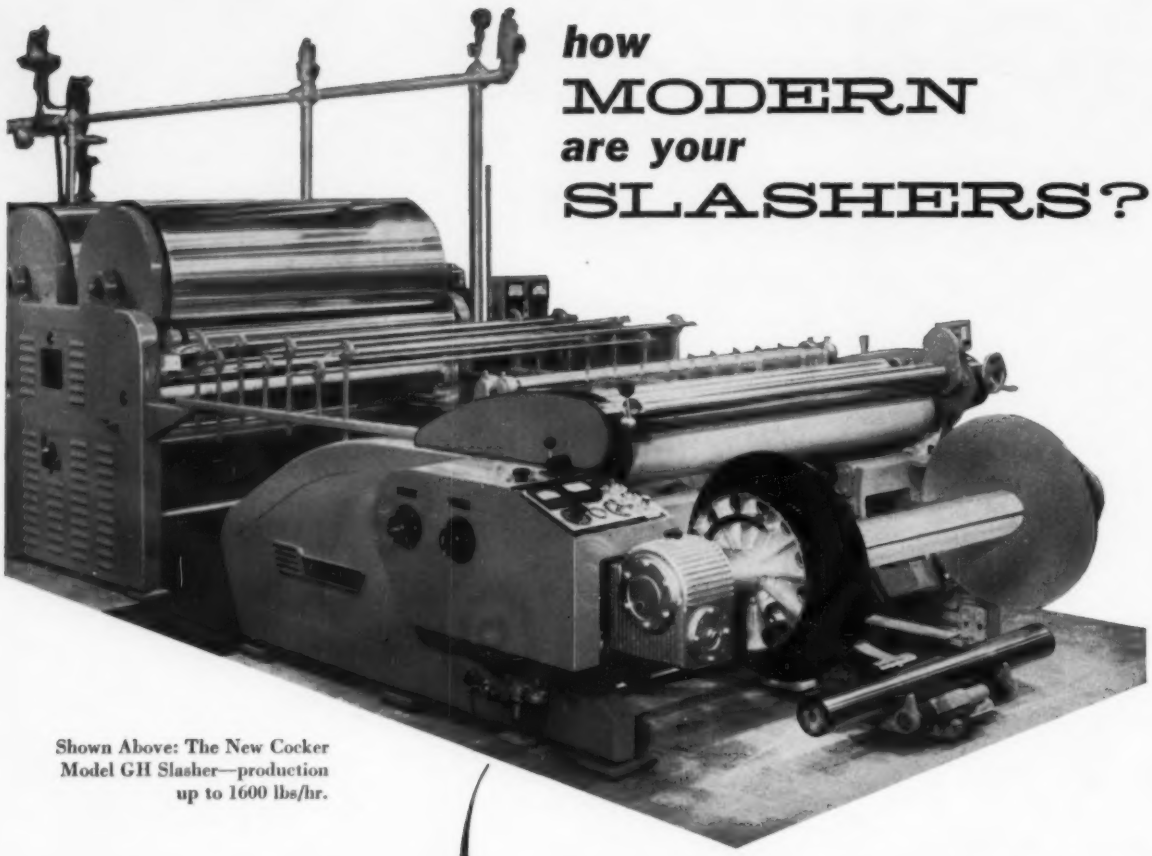

Shown Above: The New Cocker Model GH Slasher—production up to 1600 lbs/hr.

Most of the important improvements on slashers were first introduced by Cocker. Many of them have since been adopted by others, but many valuable features are still exclusive on Cocker equipment. These features enable mills to produce more and better beams at lower costs. Here are some of them.

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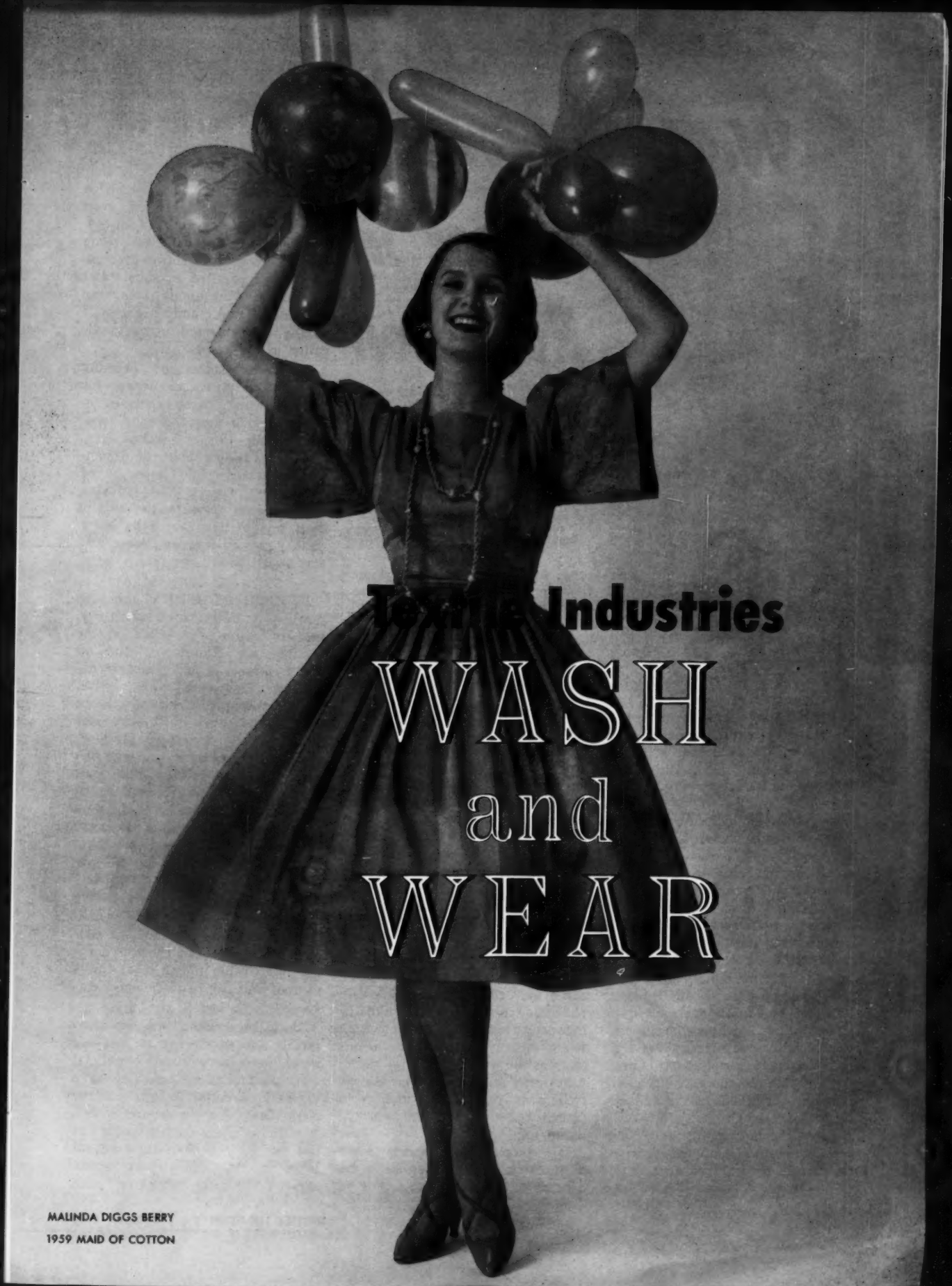


MALINDA DIGGS BERRY
1959 MAID OF COTTON

Wash-and-Wear: Concept in Evolution

by Stanley M. Suchecki
Associate Editor

Exclusive

"WASH-AND-WEAR" has come to mean something less to the consumer than its name implies. He has evaluated numerous fabrics and finishes over a period of several years; his findings still point to the immature status of the field.

He no longer looks for the kind of perfection in performance which the label of "wash-and-wear" signifies. In recognition of this, some critics point out that the label should disappear until such time as true "wash-and-wear" can be produced on a large scale.

Nevertheless, the consumer has recognized some beneficial properties in the new fabrics and finishes, and has tended to overlook their shortcomings. Meanwhile, the industry, after appraising its efforts, has begun to recognize the need for research. In this more realistic climate, the field of "wash-and-wear" has grown.

From the beginning, there have been two fields of competition: One field has centered around the use of man-made fibers; while the other has concentrated on the extension of cotton. In each field there has been progress.

The man-made fiber interests have derived benefits from a highly organized research, which has evolved the concept of fiber blending; the cotton processors have looked elsewhere—to improvements in resins, equipment and finishing techniques. Only the progressive cotton processors are beginning to grasp the complexities of resin finishing. They are just beginning to appreciate the need for original work to produce better finishing. At the moment, the line of research pursued is toward modification of fabric construction and refinement of finishing techniques.

YET DESPITE the fact that true "wash-and-wear" has not been achieved, the growth of resin finishing in the cotton industry has been rapid. This is perplexing when it is realized that various degrees of resin finishing exist; that resin finishing for crease recovery is one thing, and resin finishing for "wash-and-wear" is another.

It is interesting to ponder some of the reasons which underlie the success of resin finishing. For in its promotion there has been a tendency to place all resin finishing into the category of "wash-and-wear," to the confusion of the consumer.

What proponents of cotton "wash-and-wear" overlook is that the cotton industry had reached a high level of achievement even before resins were introduced. The post-war period saw some notable advances in cotton processing, which resulted in substantial economies. Continuous bleaching was developed, and high-speed dyeing was perfected for the application of fast colors.

Numerous styles of printing were already in existence for roller printing. These processes remain to this day the most economical in the entire industry. Moreover, the problem of dimensional stability had been licked many years before. The industry had only to provide the public with imaginative fabric styling—quality was an inherent thing, and was available at low cost.

IN RESIN FINISHING the properties of cotton are not obscured, though admittedly some shortcomings are eliminated. And no doubt, cotton acquires a new dimension. However, if the cotton fiber is not preserved to a large degree, the fabric will have lost much of its usefulness. Indeed, some of the criticism of resin finishing has been leveled at the loss of inherent properties, and much more has been directed at the new problems acquired along the way. But nevertheless resin finishing represents progress, even if only crease recovery can be attained.

The consumer appears to be satisfied with what is being accomplished along these lines. Besides, can it be that there is nothing comparable among other fibers at the price of resin-finished cottons?

Thus the economics of raw materials and processing on the one hand, and recognized beneficial fiber properties on the other, have decidely favored cotton in the competition for "wash-and-wear". Yet the industry on the whole has not put its best foot forward—at least in two important areas. Characteristically, it has been

price conscious. And this has been a chief deterrent to better quality for large volume markets.

In the other area, the industry has not kept abreast of progress. Not long ago, finishers clamored for improvements in resins. The chemical industry has now begun to supply these. And machinery manufacturers have begun to provide adequate equipment and tools for uniform finishing in volume. It is now up to each plant to initiate quality control measures, and launch the kind of research which will assure better finishing. The means and tools are now available.

CRITICS may point out, however, that many problems exist. But none of these is altogether new. In many cases they are well understood, and products and techniques have been developed to overcome them. The problem of chlorine retention is such an example. The chemical industry went ahead and developed non-chlorine retentive resins; and workers in the field have already demonstrated that improper finishing can also create this problem. Wet soiling is another problem. This can be overcome by sound product evaluation and sound resin formulation.

No doubt, some problems are not strictly within the control of finishing plants. The problem of loss in tensile strength offers perhaps the largest area for organized research. But finishers must surely be aware that the answer to better finishing cannot lie entirely in unique construction of yarns and fabrics.

Other problems, though not of such wide scope, could be mentioned. But in meeting the challenge of "wash-and-wear" the industry has been taking the easy way out. It has been sitting back in anticipation of perfect products and equipment. Meanwhile, there has also been a great deal of finishing for price rather than for attainable quality.

PERHAPS A HUNDRED or more finishers are now competing for resin finishing markets. In view of the high productivity of the industry, it is not difficult to visualize the adverse effect that only a handful of finishers can have on progress. This has led progressive finishers to begin educational programs directed at distribution and consumer levels.

STILL A FEW THINGS TO IRON OUT

For many rules can be broken in resin finishing. As everyone knows, the properties upon which fabric performance depends cannot be evaluated by the consumer. For that matter, at the point of purchase, even finishing experts cannot predict how a fabric will perform nor can they detect what problems may be in the offing. Thus the public can have very little to go by, except for the confidence that it may have in a branded fabric.

One leading finisher clearly distinguishes between resin finishing, and finishing for "wash-and-wear," listing the standards of achievement in each case. No doubt, this is a step in the right direction. There is also indication that the industry is reaching closer agreement on methods of rating and testing fabrics.

But the industry is heterogeneous in character, and has rarely moved forward as a closely coordinated whole. For this reason, some critics doubt that for large markets higher standards of quality will soon be achieved. Yet it is conceivable that better quality should be forthcoming. For one thing, there is inter-fiber competition, just as there is competition within the chemical industry itself, to stimulate the development of improved fabrics and finishes.

But as long as deterrents stand in the way of attaining higher quality, particularly through unreasonable pricing practices, resin finishing may be a long time in reaching higher stature in the eyes of the consumer.

Creaseproofing Agents for

by A. C. Nuessle
Textile Applications Laboratory, Rohm & Haas Co.
Exclusive

THE TEXTILE finisher of the present day is confronted with a large assortment of resins and reactants, each capable of imparting, to some degree at least, a wash-and-wear finish to fabrics made of cellulosic fibers. The purpose of the present discussion is to summarize briefly the properties of some of the many types of products that have been considered for this use, and to attempt to relate these properties to their chemical structure.

At the outset it must be recognized that a wash-and-wear formulation will usually contain four or more of the following ingredients: thermosetting resin or reactant, catalyst, softener, soft thermoplastic polymer, polyvinyl alcohol or other water-soluble polymer, silicone emulsion, optical bleach, and the like. Each of these materials contributes something to the over-all finish. Nevertheless, the wash-wear effect depends largely on improved crease recovery, and as this is imparted primarily by the resin or reactant, the present discussion will be confined to that component of the finish.

Creaseproofing resins and reactants vary considerably in chemical constitution. In each case, however, the molecule is small enough to penetrate into cotton or rayon fibers. There, under influence of catalyst and heat, it will undergo a chemical reaction either with the cellulose, or with itself (forming a polymer), or both. In many instances the precise course of the reaction is not known, but it has been convenient (and in most cases sufficiently accurate) to regard it simply as a crosslinking of the long cellulose chains that make up the fibers.

As a result of this chemical change within the fibers, the treated fabric will be altered in a number of ways. If the reaction is carried out in the dry state (as by padding, drying, and curing in the customary way) both wet and dry crease recovery will be improved. Moreover, the fabric will not soak up as much water, it will shrink less, and dry more quickly; and, unfortunately, the strength will be lower. These effects are quite general, and come about in spite of wide variation in chemical composition.

In a few instances the reaction with cellulose can be carried out in the wet state, while the fibers are swollen with water. In such a case, only the wet crease recovery will be improved. There will be no reduction in water pickup or shrinkage, but there will be some loss in strength. Here again the phenomenon is a general one, and is influenced more by reaction conditions than by the chemical constitution of the creaseproofing agent.

Despite these similarities in general effect, there are a number of marked differences between the various types of resins and reactions. This may show up in the degree of creaseproofing, the durability of the effect, the tendency toward discoloration, the susceptibility to chlorine damage, the propensity to develop fish odor, and the like.

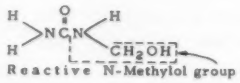
In discussing such a many-faceted subject, it will be most convenient to start out by listing a number of representative resins and reactants according to chemical structure, along with a short account of their major properties. In another section, some of the more important end-use properties will be discussed in greater detail.

TYPES OF CREASEPROOFING AGENTS

N-Methylol Types

All of the more commonly employed resin-formers and reactants are composed of nitrogen bases chemically combined with formaldehyde. A major advantage of such materials, which are known technically as N-methylol compounds, is that they will react readily with cellulose under moderate catalysis so that their application to cotton and rayon fabrics can be easily controlled.

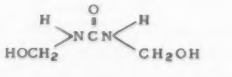
Urea-Formaldehyde: This group includes a range of products varying in formaldehyde content, methanol content, and degree of condensation. The simplest member is monomethylol urea (MMU) which has only one cellulose-reactive group:



№ 1

Because crosslinking requires two reactive groups, this is a very ineffectual creaseproofing agent when applied to cotton under acid catalysis. But it is surprisingly effective under alkaline catalysis *(11)*.* This phenomenon, which suggests that actual chemical crosslinks are not necessary to obtain crease recovery, has been further studied by Steele *(20)*. Unfortunately, washfastness is only fair. For this reason, MMU is used only in mixtures.

With two mols of formaldehyde per mol of urea, the product is dimethylol urea (DMU):



№ 2

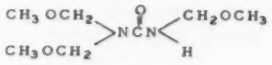
*Italic numbers in parentheses are references at the end of

Wash-and-Wear Finishing

This material performs best under acid catalysis, yielding the high degree of crease recovery to be expected of a difunctional reactant (that is, one having two reactive groups). Washfastness is quite good.

The urea-formaldehyde paste resin commonly employed to impart a wooly hand to rayon suiting is a mixture of the above materials. The average formaldehyde-to-urea ratio is about 1.3 in this country and about 1.6 in England.

Liquid UF resins frequently contain as high as three mols of formaldehyde and are almost always reacted with methanol to attain greater storage stability. Washfastness is good. A typical product is tri-methoxymethyl urea:



№ 3

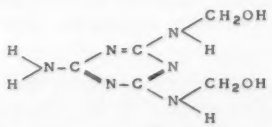
Formaldehyde content above three mols is not feasible, as the molecule is not stable and will split off formaldehyde in water solution.

Some products are partly pre-polymerized. If carried too far this will produce a stiff hand on fabric and interfere with dry crease recovery, especially in the case of rayon, although wet recovery may be improved.

As a class, the urea resins lack chlorine resistance, due in part to the fact that it is impossible to block all the >NH groups which pick up chlorine from bleach baths. This more or less limits their use to colored fabrics. (However, a line of wash-and-wear white shirts imported from England has been finished with UF resin.)

As has been indicated, the durability (i.e., washfastness) of the crease-proofing and wash-wear effects will vary from fair to good, depending on the formaldehyde content; but in no case is it likely to be quite as good as that of certain cyclic ureas and melamines.

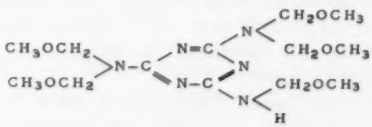
Melamine Formaldehyde: As melamine has six reactive sites, a wide range of products is possible. The simplest commercial product, a dimethylol melamine, has a formaldehyde ratio of 2:



№ 4

This is a powdered material with poor storage stability. A related product has four mols of formaldehyde.

Liquid products with good storage stability are obtained by reaction with three or more mols of formaldehyde, plus further reaction with methanol (i. e., methoxymethylation). As with urea, it is very difficult to block all the >NH groups with formaldehyde, although reaction with up to five mols of formaldehyde and five mols of methanol is commercially feasible. Such a product is penta-methoxymethyl melamine:



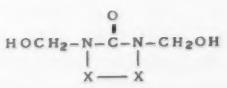
№ 5

Washfastness of melamine resins is very good. Chlorine pickup ranges from very high (as for compound No. 4) to moderately low (as for No. 5). This is roughly the same range as is shown by urea resins. However, melamines have less tendency to damage at a given chlorine content because of their greater basicity or buffering power.

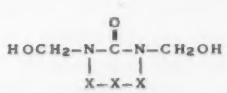
A major drawback of melamine resins is the tendency to yellow on chlorination. This is reduced somewhat by high formaldehyde content, and particularly by methoxymethylation. Use of metal salt catalysis (e. g., magnesium chloride or zinc nitrate) gives further improvement. However, hot chlorination (above 140 F) will usually produce the typical yellow tinge. A somewhat more effective remedy is the use of melamine-ethyleneurea mixtures *(18)*.

Further comment on melamine derivatives is made in the section on "Other Types."

Cyclic Ureas: This group contains a large number of individuals, each of which may be regarded as being composed of dimethylol urea with a cyclic two- or three-membered side chain attached to the nitrogen atoms:

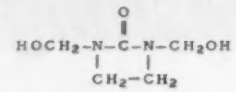


or



These are usually supplied as liquid products containing about 50% solids in water solution.

One of the most important members of the group—and by far the most important until just recently—is dimethylol ethyleneurea* (DMEU):



№ 6

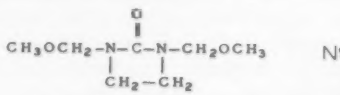
This storage-stable product, which reacts readily with cellulosic fibers, imparting very durable crease resistant effects, has become the standard by which all other cylic ureas are judged. DMEU gives a soft hand due to absence of insoluble surface resin, which cannot form unless the ring breaks—and the ethyleneurea ring is very stable to heat. Accordingly, one of the earliest uses was embossing: Not only was the finish very washfast, but the DMEU did not clog up the fine lines in schreiner calenders *(13)*.

From the outset, DMEU was referred to as a "cellulose reactant" in distinction to the earlier UF and MF types which were known as the thermosetting resins *(10, 14)*. This was the origin of the general term "resins and reactants" to include all types of creaseproofing agents.

Use in wash-wear finishes has been based not only on durability, but also on superior chlorine resistance compared to previous types. Because there are no free >NH groups, chlorine pickup is low; therefore chlorine damage is low, even after severe laboratory testing. Moreover, the treated fabric does not yellow on chlorination.

Unfortunately, the finish is "loosened up" (though not removed) by repeated alkaline washes and laundry sours, so that while the crease recovery remains high, the chlorine damage increases sharply. For this reason, DMEU has not been widely used on white fabrics that will be commercially laundered.

Somewhat better resistance to chlorine damage can be achieved by reaction of DMEU with methanol, to obtain di-methoxymethyl ethyleneurea:

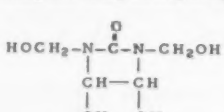


№ 7

The improvement is due to the more stable end-groups, which (if left unreacted with the cellulose) do not split off as readily and thus do not regenerate free >NH groups.

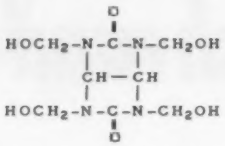
However, because of the higher molecular weight the product is less efficient, and the degree of improvement has not proved to be worth the added cost.

Two cyclic ureas that have attained considerable use in Europe, though not to any extent in this country, are dimethylol dihydroxyethyleneurea:



№ 8

and tetramethylol glycoluril:

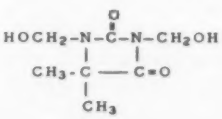


№ 9

These are related, in that both are made from formaldehyde, glyoxal, and urea, in differing proportions. Both are very efficient creaseproofing agents, rivaling DMEU in this respect. Theoretically these compounds should be as chlorine-resistant as DMEU, but commercial specimens invariably show higher chlorine pickup and higher damage. To some extent this may be caused by impurities. However, there is evidence that the difficulty is due in part to an inherent instability of the molecule.

An advantage of such products over DMEU is their less adverse effect on lightfastness of dyes. DMEU is the most harmful of all common creaseproofing agents. Straight UF resins (Nos. 1, 2, 3) are least harmful. The above materials (Nos. 8 and 9) are in the latter class.

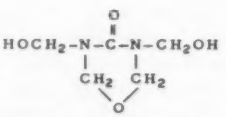
At least one cylic urea acts largely as a formaldehyde carrier. This is dimethylol dimethylhydantoin:



№ 10

Fabric treated with this compound will contain very little nitrogen after scouring, The crease recovery/strength ratio will be rather low, about like that of a simple formaldehyde treatment with a buffered catalyst. Accordingly, this chemical has not enjoyed much use.

Thus far we have considered cyclic structures having 5-membered rings. There are also a number of prototypes having 6-membered rings. Among these is dimethylol uron:



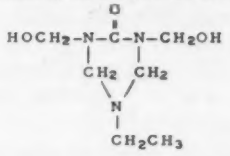
№ 11

This has rather poor stability and tends to split off formaldehyde when acid-catalyzed. Fabric strength is therefore quite low, and chlorine damage is excessive. The corresponding di-methoxymethyl derivative is more stable, and can, for example, be distilled under vacuum, but nevertheless will break down to some extent on application to fabric and so will have less chlorine resistance than might be expected.

Currently the most noteworthy of the cyclic ureas are the various members of the perhydrotriazone family (commonly called triazones) which have a tertiary nitrogen atom (>NR) in the ring. Typical

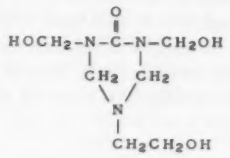
*For convenience, the simplest chemical names will be used throughout, in preference to more precise but much more complicated designations.

examples are dimethylol ethyltriazone:



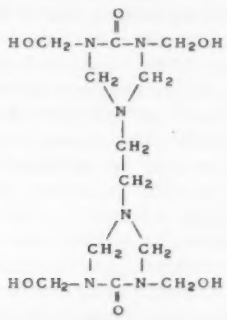
№ 12

and dimethylol hydroxyethyl triazone:



№ 13

Many more-complicated varieties can be visualized. An example from the technical literature *(16)* is dimethylol ethylene bis triazone:



№ 14

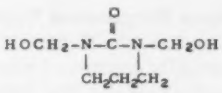
The major advantage of the triazones over other cylic ureas is their resistance to chlorine damage. Although they pick up a little chlorine, they do not damage on ironing because of the basicity of the tertiary nitrogen, which buffers the hydrochloric acid released by the heat *(9)*. Unlike DMEU (No. 6) they will not show damage even after multiple alkaline washes followed by severe chlorination and scorching.

Effect on lightfastness of dyes is intermediate between that of DMEU (No. 6) and the least harmful products (Nos. 1, 2, 3, 8, 9).

The major disadvantages are tendency to yellow on ironing, either with or without chlorine present, and tendency to evolve fish odor. The various triazones differ in this regard. For example, the methyl and ethyl triazones show much fish odor but little yellowing, whereas the hydroxyethyl triazone shows little fish odor but more pronounced yellowing. A thorough afterwash, which is usually recommended as part of the plant process, will eliminate the fish odor and reduce the yellowing tendency.

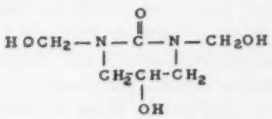
Triazones of one type or another are enjoying considerable use at the present time for wash-and-wear finishes on white goods. However, few are pure chemical entities. As Wayland has pointed out: " . . . there are now on the market a number of triazone resins. These vary in solids content from less than 50% to over 80%, in shelf life from a few weeks to many months, in triazone-to-urea formaldehyde from less than one-to-one to infinity, and in free formaldehyde from almost none to very large excesses" *(21)*. Their exact properties naturally vary with their composition.

Publicity is currently being given to two other cyclic ureas with six-membered rings *(3)*. These will be referred to for simplicity as dimethylol propylene urea:



№ 15

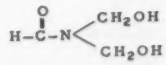
and dimethylol 5-hydroxypropylene urea:



№ 16

These materials are slightly more chlorine resistant than DMEU, presumably because of the fact that the 6-membered ring is more resistant to hydrolysis than is a 5-membered ring. Other properties are generally similar to those of DMEU.

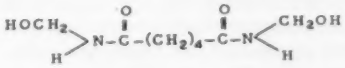
Other Types: Before concluding the discussion of the N-methylol class, brief mention will be made of several additional members. The first is dimethylol formamide:



№ 17

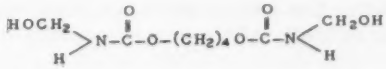
This is essentially a formaldehyde carrier, like the hydantoin derivative already discussed (No. 10). Many years ago it was used in Germany for hydrophobizing (i. e., reducing the water pickup) of rayon. In this country it has been proposed as a creaseproofing agent but has not found any market.

Two newer compounds mentioned in a recent German publication *(17)* are dimethylol adipamide:



№ 18

and dimethylol butanediol diurethane:



№ 19

Products of this type are not common in this country. An imported sample of the latter, applied to cotton fabric, gave only fair crease recovery and very high chlorine damage. According to the reference cited, No. 18 gives better crease recovery on cotton, and No. 19 on rayon, the over-all performance being slightly inferior to that of dimethylol dihydroxyethyleneurea (No. 8) and superior to that of dimethylol urea (No. 2). Chlorine damage is not mentioned.

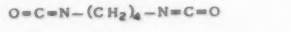
In this country a new creaseproofing agent is currently being marketed under the designation "triazine." All ordinary melamine resins are triazines; but in the present instance the name is used to designate a fully methoxymethylated product based on mela-

mine in combination with (or co-reacted with) an undisclosed substance or substances. The resulting combination has rather good chlorine resistance and very little tendency to yellow on hot chlorination, when applied with a metal salt catalyst.

Other Nitrogenous Types

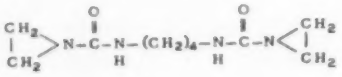
As was stated earlier, the N-methylol class includes all of the commercially important nitrogenous crease-proofing agents. However, a few non-formaldehyde-containing nitrogenous crosslinkers may be worth noting.

Diisocyanates have been used in formulations for bonding tire cord to rubber, but are too difficult to handle as creaseproofing agents. They are insoluble in water, require emulsifying, and therefore do not penetrate well. Moreover, they will react as readily with water (and so be inactivated) as with cellulose. A representative member is tetramethylene diisocyanate:



№ 20

By reaction of an isocyanate with ethylene imine, there is obtained a product such as tetramethylene-bis-N,N-ethyleneurea:

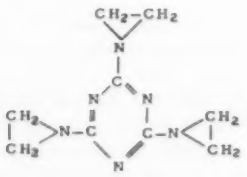


№ 21

Products of this type are sometimes referred to in the literature as *unsymmetrical* ethylene ureas because the ethylene ring is at one end of the urea molecule rather than circling around as in DMEU (No. 6). However, the name is misleading because the entire molecule is quite symmetrical.

Such compounds were developed in Germany for treatment of rayon. They are quite reactive and will cure at low temperature, forming both resin and crosslinks. However, other advantages over cheaper dimethylol compounds as wash-and-wear agents are hard to visualize. The treated fabric would be chlorine retentive and would damage because of low buffering power.

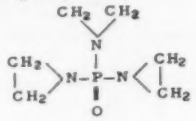
A similar but tri-functional reactant, made from cyanuric chloride, is known as tri-aziridinyl-triazine:



№ 22

Such a material should be an effective cellulose crosslinker, but cost and toxicity preclude its use for the purpose.

An analogous product that has undergone considerable study because of potential use in flameproofing, pigment binding, and other applications, is tris (1-aziridinyl) phosphine oxide:



№ 23

Low concentrations, properly catalyzed, appear to crosslink cellulose, while with higher concentrations considerable resin is produced. In either case >NH groups are formed which will tend to pick up chlorine; but damage on subsequent ironing is reported to be low *(2)*. Present cost is high, and it is questionable whether such materials will ever be competitive with cyclic ureas.

Non-Nitrogenous Types

Because of the strong emphasis on chlorine damage in this country, and because it is the >NH group which retains the chlorine, much consideration has been given to creaseproofing agents that do not contain nitrogen. Although published reports relate largely to aldehydes and aldehyde derivatives, a wide variety of compounds have been investigated.

In broad summary, certain non-nitrogenous crosslinkers give very durable crease recovery (in many cases impossible to strip out with acid) and the chlorine problem is solved; but other deficiencies have cropped up. Almost invariably, either the crease recovery or the strength, or both, will be poorer than that obtainable with nitrogenous reactants.

Accordingly, current practice is to use non-nitrogenous reactants in combination with a nitrogenous reactant, in the hope of obtaining the better properties of each. In some instances, results have been quite gratifying.

A birds-eye view of the situation is given below:

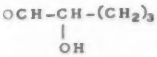
Aldehydes: Typical mono- and di-aldehydes whose effect on cellulose has been studied fairly extensively include formaldehyde:

№ 24

glyoxal:

№ 25

a-hydroxy adipaldehyde:



№ 26

The acid-catalyzed reaction of formaldehyde with cellulose was discovered in 1906, though it was not realized until 1926 that the cellulose chains were being cross-linked. Commercial use has been made of the process for shrinkproofing of rayon and for improving the resilience of rayon pile fabrics, but not to any great extent for creaseproofing of fabrics.

The chief difficulty is the low crease recovery/strength ratio, especially on cotton. No catalyst will overcome this. Another drawback is the soft limp hand, despite high crease recovery; this shows up particularly in the case of rayon. There may also be processing difficulties due to the volatility of formal-

dehyde: The odor is irritating and unpleasant, and the drying and curing steps require careful control.

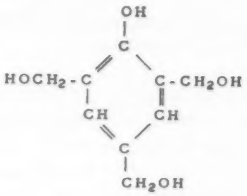
The shrinkproofing and creaseproofing effects, however, are extremely durable, and completely resistant to chlorine damage.

Attempts have been made to promote a wash-and-wear finish for rayon based on formaldehyde in combination with a nitrogenous resin-former (such as No. 3) to impart a better hand. Commercial acceptance has been limited.

Glyoxal, which has somewhat less volatility than formaldehyde, has similarly been used for shrinkproofing, but not for creaseproofing. Strength is low, as with formaldehyde. Moreover, glyoxal tends to yellow on curing, although this can be minimized by choice of catalyst and curing conditions.

Efforts to obtain better strength through long flexible crosslinks, as might be produced by dialdehydes such as No. 26, have not been completely successful. It has been shown that to a considerable extent such dialdehydes crosslink cellulose through a single -CHO group, so that the average length of the crosslink will be little greater than with formaldehyde *(6)*. Moreover, it is likely that a certain amount of unavoidable acid damage occurs during the reaction of aldehydes with cellulose. Accordingly, the fabric tends to be slightly weak.

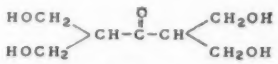
Aldehyde Derivatives: One of the first resin-formers to be used for creaseproofing cellulosic fabrics was phenol-formaldehyde, which condenses under alkaline catalysis. A typical product is 2,4,6-trimethylol phenol:



№ 27

Because of the deep yellow color of the treated fabric, this material was soon set aside in favor of urea-formaldehyde in the early days of crease resistant finishing.

Later, ketone-aldehydes attained a modest degree of acceptance. An example is tetramethylol acetone:

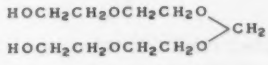


№ 28

Other products of this type may contain 2 to 6 mols of formaldehyde. All require alkaline catalysis. The treated fabric tends to discolor slightly, and requires after-bleaching. Crease recovery is usually rather low, but resistance to chlorine damage is excellent.

In some cases, treated fabric has shown a tendency to become yellow during use, and this has been a major drawback.

Quite recently, acetal reactants have been given serious consideration. These are produced by reaction of formaldehyde with alcohols. Typical examples are diethyleneglycol acetal:



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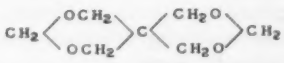
and pentaerythritol bis acetal:



№ 30

The glycol acetals, which are usually slightly more condensed than is represented above, split into fragments under acid catalysis, and crosslink the cellulose *(7)*. Crease recovery with this type is rather low.

The pentaerythritol product gives high crease recovery, accompanied by high strength loss. Metal salt catalysts are recommended.

Despite the extreme durability of the effect, plus complete absence of chlorine damage, acetals are rarely used alone, but nearly always in conjunction with nitrogenous resin. In fact, many commercial acetal products are supplied in the already-blended form.

Epoxides: The epoxy resins are a family of compounds based on diglycidyl ethers of polyols. One of the simpler members is ethyleneglycol diglycidyl ether:

№ 31

Because the lower epoxides may be volatile or toxic, compounds offered commercially are of necessity of rather high molecular weight (300 to 400) and are therefore inefficient as creaseproofers because of the small number of crosslinks formed. A very strong acidic catalyst (zinc fluoborate) is required for best results. These factors, coupled with high cost, limit their use despite such advantages as complete durability of effect, freedom from chlorine damage, and absence of amine or formaldehyde odors *(4)*.

Accordingly, the chief use of epoxy crosslinkers has been in conjunction with nitrogenous materials such as dimethylol ethyleneurea (No. 6). A synergistic (or more-than-additive) effect is obtained, resulting in high crease recovery, low chlorine damage, and excellent washfastness. However, such combinations have not attained much commercial acceptance, primarily because of the lower cost of triazones and other competitive finishes.

Wet Creaseproofing Processes

It was stated at the outset that reaction in the wet state improves only the wet crease recovery. Such a finish will have poor dry recovery, so that the fabric will not resist wrinkling in use, nor can it be successfully tumble dried. However, drip drying will be feasible, and in fact possibly superior to that obtainable through more conventional processes.

Wet crosslinking is ordinarily carried out by padding the fabric through a solution of caustic soda, then soaking it in a difunctional crosslinker such as

a dichloropropanol:

$$Cl\,CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_2Cl \qquad \text{№ 32}$$

A similar effect can be obtained with formaldehyde and sulfuric acid *(8)*.

In either case, it is probable that only a few crosslinks are formed, most of the reaction occurring on individual cellulose molecules, forming side chains and rings. This "opens up" the fiber so that it is more easily distended with water.

Such a process has recently been promoted on a wide scale with considerable acceptance, particularly in the sheeting field. It is also being used as a preliminary treatment for fabrics that will later be resin treated in the normal way.

FACTORS INFLUENCING CERTAIN END-USE PROPERTIES

With such a wide array of creaseproofing agents available, it would be very helpful to be able to predict from the chemical structure the exact properties each compound will impart to the treated fabric. However, there are many factors that complicate the situation. In the sections below will be outlined some of the underlying factors that relate to end-use properties.

Crease Recovery

Crease recovery varies widely among products of different chemical composition, and there are no all-inclusive rules to predict the efficiency of a given compound. *Figure 1* illustrates the range of efficiency of a number of products, each applied with a catalyst well suited to it, though not necessarily ideal. Comparisons such as this are of value only as approximations, because the effect of the creaseproofing agent cannot be divorced from the contributing effects of catalysis and cure.

Some of the many factors that have bearing on the complex relationship between chemical structure and creaseproofing are as follows:

Ability to Crosslink Cellulose: In general, the most effective creaseproofing agents are those which form actual crosslinks. Thus, when N-methylol compounds are applied under acid catalysis, the efficiency increases sharply as the formaldehyde ratio rises from one to two. This is why most creaseproofing agents are difunctional (i.e., have two reactive groups). Incidentally, formaldehyde itself is difunctional, as is easily visualized if we consider that it forms a hydrate in water solution:

$$CH_2O+H_2O\longrightarrow HOCH_2OH$$

before reacting with the cellulose.

Molecular Weight: The lower the molecular weight, the greater the number of crosslinks that are theoretically obtainable from a given weight of compound. This is one reason why formaldehyde and glyoxal (Nos. 24, 25) are so efficient and why epoxy resins (No. 31) are relatively inefficient. Also, why DMEU always gives slightly but definitely higher recovery than the closely related triazones.

Rate of Reactivity With Cellulose: In order for crosslinks to form during the few minutes in which the fabric is in the curing oven, the rate of reactivity must be high. Compounds differ considerably in this respect. N-methylol compounds, for example, are much more reactive than C-methylol compounds (No. 28), acetals (No. 29), or epoxides (No. 31).

To some extent, differences in reactivity can be minimized through the use of stronger catalysis and cure. Common acidic catalysts range from weak to strong in the approximate order ammonium phosphate, ammonium sulfate, amine hydrochloride, magnesium chloride, ammonium chloride, zinc nitrate, zinc fluoborate.

Alkaline catalysts increase in strength in the order sodium bicarbonate, sodium carbonate, sodium silicate, sodium hydroxide. These ratings are somewhat dependent on temperature of cure, and in some cases (amine hydrochloride and sodium silicate) on which of the several varieties is used. The effect of a given catalyst may also depend somewhat on which creaseproofing agent is involved.

Because of their low rate of reactivity, epoxides and ketone aldehydes require very strong catalysis, otherwise crease recovery would be exceedingly low. On the contrary, N-methylol compounds give good crease recovery even with mild catalysis; where stronger catalysts are employed, other properties such as chlorine resistance or durability are usually the major objective.

Nevertheless there are differences among N-methylol compounds; for example, the optimum curing temperature for MF types is higher than that required for UF's and most cyclic ureas.

Formaldehyde Crosslinks: During the cure, many N-methylol compounds liberate formaldehyde, part of which may react directly with cellulose, forming short crosslinks. This adds to the crease recovery, although the strength will be disproportionately lowered. Such crosslinks, which cannot be removed by acid stripping, probably result to some extent when DMEU is given a severe cure.

Internal Resin Formation: This is a controversial subject *(11)*. Nearly all cellulose reactants can—and to some extent probably do—form a linear polymer before crosslinking. So-called resin-formers, such as UF and MF products of low formaldehyde ratio (e.g., Nos. 4, 2, and mixtures of 1 and 2), no doubt form considerable polymer as well as crosslinks.

Some authorities believe that only actual chemical (covalent) crosslinks will provide crease recovery, and that any resin formation will be completely worthless. However, there is evidence (see comments under monomethylol urea, No. 1 and the curve for MMU-sodium bicarbonate in *Figure 1)* that certain linear polymers can give crease recovery through physical links (i.e., hydrogen bonds). Unfortunately, we have no way of predicting, in most instances, how much polymer will form, or how effective it will be. The most we can say is that, usually, resin-formers

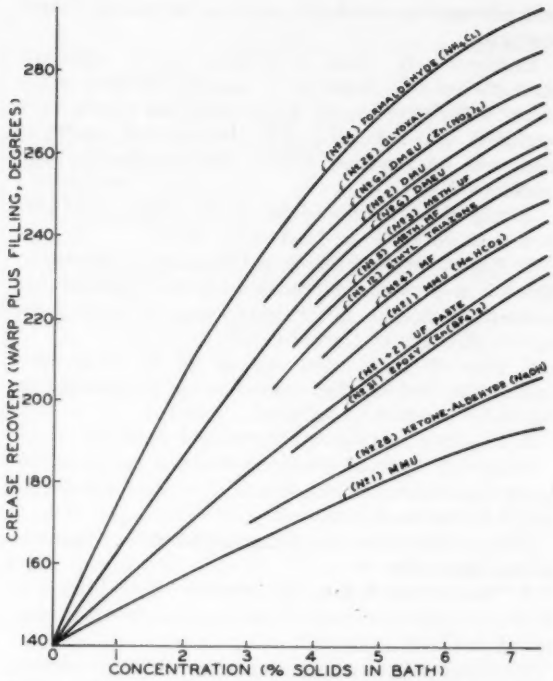


Figure 1. Relative efficiency of various creaseproofing agents as applied to cotton sheeting. An amine hydrochloride catalyst was used in all cases, except where otherwise noted. Wet pickup was 70%, and the samples were cured for 10 minutes at a temperature of 300 F.

are less efficient than cellulose reactants in providing crease recovery on an equal-solids basis.

Surface Resin: If a creaseproofing agent is partially pre-condensed, so that some of the molecules are too large to penetrate into the fiber, surface deposits will be produced. In such a case the dry crease recovery will be lowered, although the wet recovery may be increased. This effect is particularly noted on rayon, which is less permeable to large molecules than is cotton.

Volatility: In rare instances, volatility is a factor. The lower aldehydes would be even more efficient except for the fact that much of what is applied evaporates during drying and curing.

If we apply the above concepts to the cyclic ureas, we find that DMEU (No. 6) is very efficient because it has a relatively low molecular weight, is non-volatile, readily crosslinks cellulose and also yields a few formaldehyde crosslinks, but forms little internal resin and no insoluble surface resin.

The triazones (Nos. 12, 13) are slightly less efficient, primarily because they are somewhat higher in molecular weight. Most of the cyclic ureas are close to DMEU and the triazones in efficiency.

Except for dimethylol urea (No. 2), all UF and MF products are less efficient than DMEU. This may reflect higher molecular weight and/or a tendency to form polymers rather than crosslinks.

Formaldehyde and the lower aldehydes (up to five carbons in length) are more efficient than DMEU. All other non-nitrogenous compounds are less efficient, due in some instances to higher molecular weight but more generally to sluggish reaction with cellulose.

Durability

As regards durability or washfastness of the creaseproofing effect, the situation can be summarized very briefly as follows:

Effect of Chemical Composition: Some creaseproofing agents are practically impossible to remove. Aldehydes, acetals, and epoxides are in this class. Most others, including all N-methylol compounds, can be removed completely by an acid strip, and very slowly and gradually by less drastic means.

In general, resin formers are less durable than reactants, and it has been contended that two end products can be separated by alkaline washing *(17)*. This is undoubtedly an oversimplified view. There are differences between resin-formers (low-formaldehyde urea resins being less durable than the corresponding melamines) and there are similar differences between reactants (triazones, for example being slightly less resistant to alkaline washing than is DMEU).

Application Conditions: The importance of application conditions must not be overlooked. Durability of a given resin or reactant is increased by use of more effective catalysis and greater severity of cure, so that a higher proportion of the reactive groups are persuaded to form crosslinks, or are locked into tighter polymer formation.

In the case of N-methylol reactants, severe curing converts easily-hydrolyzed ether linkages ($-N.CH_2OCH_2.N-$) into more resistant methylene linkages ($-N.CH_2.N-$). In addition, a few simple formaldehyde crosslinks may be produced. It must be remembered, however, that durability achieved through more severe curing is usually accompanied by lower strength.

Method of Test: To be completely durable, a wash-and-wear finish must resist alkaline washing, hypochlorite bleaching, and acid souring. Triazones, while somewhat less resistant than DMEU to the first two, are superior in resistance to acid souring, especially at low pH (below 4). This is of no importance insofar as home laundering is concerned, but very important if the fabrics are to be laundered commercially.

Strength Loss

Strength loss is one of the most important aspects of the resin finishing of textiles. Despite considerable study, however, there are a number of phenomena that have yet to be explained. The situation is complicated by the fact that there are differences between cotton and rayon, and that various types of strength tests (tensile, trapezoid tear, Elmendorf tear, etc.) do not always correlate with each other *(11)*.

For the sake of brevity we may avoid some of these complications by limiting the discussion to cotton and considering strength loss in general.

All cotton fabrics show a sharp loss of tensile

strength as a result of the creaseproofing process, and —in the absence of softener—an even greater loss in tear strength.

At a given level of crease recovery, the loss in strength will vary with type of creaseproofing agent *(1, 11, 19)*. As a general rule, to which there may be a few exceptions, the loss in the case of acid-catalyzed treatments will run from most to least in the following order: formaldehyde, non-nitrogenous reactants, nitrogenous reactants, nitrogenous resin-formers.

It has long been recognized that most of the strength loss is due to changes in mechanical properties of the fibers. That is, because of the resin content and/or crosslinking, the fibers can no longer stretch as readily to relieve stresses and strains on the yarns. Therefore resin-treated yarns break more readily than untreated yarns. Where this is the only source of strength loss, the original strength can be restored by stripping out the resin.

However, considerable difficulty arises in trying to account for differences between compounds as regards strength loss at a given level of crease recovery. There are at least three factors to be considered:

Length of the Primary Crosslinks: The low strength of formaldehyde treatments may be due to the very short, rigid crosslinks it produces. It has even been claimed that the difference in tensile strength between reactants (such as DMEU) and resin-formers (such as trimethylol melamine) is due to the fact that the latter have a greater tendency to polymerize and thus yield larger, more flexible crosslinks.

Short Secondary Crosslinks: In many cases, a few short crosslinks can result from formaldehyde splitting off from methylol compounds during the cure. This will tend to lower the strength regardless of the length of the major or primary crosslink. Such an occurrence is likely in the case of any acid-catalyzed reaction of formaldehyde-containing compounds, including acetals, cyclic ureas, and UF and MF resins. However, compounds containing a low proportion of formaldehyde and high >NH content (i. e., resin-formers) will be less likely to liberate formaldehyde than will reactants.

Cellulose Degradation: There is always a possibility of acid hydrolysis of the cellulose during the cure. In this respect, cotton is more prone to acid damage than is rayon. Similarly, alkaline catalysis can produce oxidation damage.

The relative importance of these factors is hard to assess, and in fact may differ considerably, depending on which creaseproofing agent is involved. In the case of formaldehyde itself, strength loss may result not only from short crosslinks, but also from acid damage due to the low pH required for catalysis. In the case of certain cyclic ureas, which are sometimes given a "hard cure" (as, for example, to obtain maximum chlorine resistance) all three factors may be involved.

With more moderate cure and milder catalysis, the second and third factors can largely be avoided. In such an instance, there is very little difference in *tensile* strength between nitrogenous resin-formers and nitrogenous reactants, and no difference in *tear* strength.

Unfortunately, most published reports attribute strength loss to a single factor, usually the first or the third, without reference to whether the others were excluded. It is obvious that further careful investigation will be required before the situation is well understood.

It might be mentioned in passing that rayon differs from cotton in at least three ways:

1. On rayon there is less *tensile* loss. Moreover, there is a greater difference between reactants and resin-formers, the latter sometimes *increasing* the tensile strength of rayon by 20% or more.

2. *Tear* strength losses are severe on both rayon and cotton, but can be restored more completely on rayon by addition of softener.

3. Rayon is less susceptible to acid damage.

These differences between cotton and rayon, which have been discussed elsewhere *(11)*, are outside the scope of the present subject.

There are also several differences between tear and tensile strength:

1. Tear strength may be improved by addition of softeners and lubricants. Tensile strength is, if anything, lowered.

2. Conversely, surface deposits, of thermosetting resin decrease tear strength, but may slightly improve tensile strength.

3. Tear strength is greatly affected by type of test (Elmendorf, trapezoid, etc.).

4. Tear strength is greatly affected by fabric construction.

Abrasion resistance is an even more complicated property, and will be by-passed in the interests of brevity.

Chlorine Damage

All nitrogenous resins and reactants tend to pick up chlorine from hypochlorite bleach baths, and hold onto it despite prolonged rinsing or prolonged storage in the dry state *(Table I)*. This phenomenon is known as chlorine retention.

When the fabric is subsequently ironed or hot-pressed, the chlorine is released in the form of hydrochloric acid, which weakens the fabric. This is known as chlorine damage.

The amount of retained chlorine need not be high in order for damage to occur. Under certain circumstances, cotton fabric can be severely damaged by less than 0.1% dried-in chlorine. Viscose rayon requires about 0.4% for equivalent damage *(11)*.

In the given fabric, the degree of damage will vary *directly* with (a) the amount of chlorine retained and (b) the temperature of ironing, and *inversely* with (c) the basicity or buffering power of the resin *(9)*. It is probable that most other influences are associated with one of these.

There are many factors that can affect the amount of chlorine retained. Chief among these is the number of free >NH groups left in the resin molecule after it has been applied to the fabric. Thus, products Nos. 1, 2, 4 will show high retention, as indicated in *Table I*, whereas the cyclic ureas (Nos. 6-16) will show low retention, the exact amount depending on

TABLE I. Chlorine Retention According to Resin or Reactant Type

Type	Nearest Ref. No.	Formaldehyde Ratio*	Solids Applied** %	Cl Retained After Storage % 0 Hr	5 Hr	72 Hr	Orig. Cl After 72 Hr %
Urea F	1, 2	1.3	10	1.28	1.13	0.66	52
Methylated Urea F	3	2.5	5	0.39	0.35	0.25	64
Methylated MF	5	3.0	6	0.63	0.63	0.59	94
Ethylene Urea F	6	2.0	5	0.07	0.07	0.06	86
Ethyl Triazone F	12	2.0	5	0.17	0.15	0.08	47

*Formaldehyde ratio will help identify compound, since reference number shows only the general type.
**Applications to cotton sheeting at typical end-use levels, using 1% amine HCl catalyst and curing for 10 minutes at 300 F. Chlorination according to AATCC Tentative Test Method 69-1958.

the stability of the molecule and the extent of reaction with cellulose.

With thermally stable molecules, such as DMEU, severe curing helps by giving a more complete reaction with cellulose. This is true even after crease recovery has leveled off, since crease recovery will not change much depending on whether 90% or 95% of the theoretical reaction has taken place, whereas chlorine pickup— which depends on the 10% or 5% of incompletely reacted material—will be cut in half.

Severe after-washing has the opposite effect, as it "loosens up" the finish and increases the chlorine pickup, even though crease recovery is not noticeably affected.

This "loosening up" may come about by hydrolysis of dangling (i. e., unreacted) end groups, or by splitting of the cyclic ring structure. The importance of chemical constitution is illustrated by compound No. 7, which has more stable end groups than DMEU (No. 6) and by Nos. 15 and 16 which may be superior in ring stability. On the other hand, DMEU appears to have a more stable ring than Nos. 8, 9, 11, 12, 13, 14.

The tendency for some products to release their chlorine faster than others *(Table I)* is usually of little importance, as fabrics are usually ironed or pressed within 24 hours of washing. However, it should be brought out that some resins, notably melamines (Nos. 4 and 5) retain chlorine tenaciously, so that the concentration may build up to a dangerous level during a series of mild chlorinations. Most other resins and reactants do not do this.

Chlorine retention can also be caused by impurities, dyestuffs, or other finishing agents. The tendency of yarn-dyed fabrics to retain chlorine is due to impurities still present in the cotton because of the failure to kier boil. No less-drastic scouring treatment thus far developed will satisfactorily remove these impurities.

The second factor—ironing temperature—will not be discussed in detail as this is an arbitrary matter, albeit an important one. It may be worth noting, however, that if wash-and-wear fabrics are dried at low temperature, and not ironed, there will be no possibilty of chlorine damage with any resin or reactant.

The third factor, buffering power, relates to the ability of the resin finish to neutralize the acid released during scorching. Buffering power is best exemplified by the triazones (Nos. 12 and 13) which pick up somewhat more chlorine than DMEU (No. 6) but do not damage as much on subsequent ironing. The distinction is most pronounced after severe alkaline washing, which causes the DMEU finish to exceed the critical 0.1% chlorine level on subsequent chlorination. The triazone finish may pick up 0.2 or 0.3% chlorine under such circumstances and still not damage because of its greater buffering power.

Buffering power of a resin can be estimated roughly by titrating the resin directly with dilute acid and noting the rate at which the pH drops *(9)*. Of all the compounds discussed under "Types of Creaseproofing Agents," appreciable buffering power is provided only by the melamines (Nos. 4, 5) the triazones (Nos. 12, 13, 14), and the trisaziridinyl triazine (No. 22). All other compounds must depend on low chlorine retention in order to avoid damage.

However, buffering power on the fabric can be increased by use of a metal salt catalyst such as magnesium chloride or zinc nitrate, particularly if followed by alkaline after-treatment such as padding through soda ash solution. This precipitates basic magnesium carbonate or zinc carbonate inside the fibers.

In all of the above, we have been referring primarily to chlorine damage as measured by the AATCC Chlorine Damage Test 69-1958. This is an accelerated test which is more severe than any the fabric is likely to receive in end use. It is widely recognized that fabrics not passing the test may nevertheless be satisfactory under many conditions of end use.

However, fabrics which do pass the test, particularly after alkaline washing, obviously can provide a greater margin of safety than those which do not. It is for this reason that triazones and certain modified melamines are being widely used in the treatment of white wash-and-wear fabrics.

Before leaving the subject of chlorine damage, a fourth major factor will be mentioned briefly. This is the susceptibility of the fibers to acid degradation. It was stated at the outset that cotton damages at lower chlorine content than rayon. This is a reproducible phenomenon and can readily be demonstrated in the laboratory.

There also appear to be differences among cotton fabrics, depending on their previous history. For example, on rare occasions, a cotton fabric (usually a well-prepared, highly mercerized one) will show greater damage than one given average preparation. This phenomenon is a most obscure one, because

laboratory investigation has given inconclusive results. Nevertheless it has shown up frequently enough to warrant further consideration.

Fish Odor

Fishy amines are produced in a resin-treated fabric in one of three ways *(12)*:

1. By reaction between ammonia, formaldehyde, and formic acid. The ammonia may come from ammonium salt catalyst, from urea (though not from melamine or ethylene urea), or from certain other bath additives. Formaldehyde is provided by the resin or reactant. Formic acid may be present from oxidation of formaldehyde (as in old batches of resin) or from bath additives such as certain wax-emulsion water repellents.

In the case of simple urea resins, presence of ammonia and formaldehyde cannot be avoided, as they are readily available through thermal decomposition of the resin. However, if formates are removed (as for example by ion exchange) no amine will be produced unless the concentration of formaldehyde is quite high.

2. By reaction of an excess of formaldehyde with ammonia. Most cyclic ureas, for example, lose considerable formaldehyde during the cure, and this may produce fishy amine by direct reaction with ammonia. The latter should be excluded by avoiding ammonium salt catalyst, urea (sometimes added to eliminate formaldehyde odor), or other additives that will break down to provide ammonia.

In a few cases the cyclic urea ring itself may serve as a source of ammonia (e. g., No. 11) but other compounds (e. g., No. 6) are so stable that if all other ammonium-containing substances are excluded, no fishy amine can be formed.

3. By breakdown of the ring structures during the cure. This is most noticeable with the triazones (particularly No. 12). There is no way to avoid this, and a strong alkaline after-wash is required to eliminate the amine.

Regardless of the mechanism, it is believed that the fishy amine is produced during the curing step, rather than during storage of the treated fabric. All the available evidence suggests that this is so. However, the amine is held in the fabric as the acid salt. It is the slow hydrolysis of the amine salt that causes the later development of fish odor.

Acid catalysts vary in their ability to hold onto amine. All acid catalysts will hold it during the cure, but later, when the fabric is subjected to hot, wet storage conditions, some catalysts release it more quickly than others. For example, boiling water will librate trimethylamine held by ammonium chloride, ammonium phosphate, or magnesium chloride. But only hot alkali will liberate amine held by zinc nitrate, zinc chloride, or tartaric acid.

In the case of certain triazones, so much amine is produced that no catalyst will hold it completely. In such instances, a hot alkaline after-wash is a necessary part of the process. However, it should be noted that triazones differ both in the amount and the type of amine produced, the odor being less objectionable in some cases than others.

Lightfastness of Dyes

Resins and reactants vary considerably in the extent to which they reduce the lightfastness of dyes. It is generally agreed that dimethylol ethyleneurea (No.6) has the most adverse effect, while straight urea resins (Nos. 1, 2, 3) not only have the least effect but may in a few cases actually improve the lightfastness.

According to a recent study *(5)*, resins and reactants fall into four groups:

1. The greatest reduction in lightfastness is produced by DMEU (No. 6).

2. Next in effect is guanylurea-formaldehyde (not herein listed).

3. Following the above is a group of products having a smaller but consistently adverse effect:
   Melamine formaldehyde (Nos. 4, 5)
   Triazones (Nos. 12, 13, 14)
   Ketone-aldehydes (No. 28)
   Epoxy resins (No. 31)
   Epoxy-DMEU Blends

4. Least effect is produced by urea resins (Nos. 1, 2, 3) and tetramethylol glucoluril (No. 9).

Some classes of dyes are affected worse than others, but it is claimed that a resin or reactant which is harmful to one class tends to be harmful to all.

Catalysts have a lesser and more erratic effect. Based on information from several sources, common catalysts run least to most harmful in the order magnesium chloride, amine hydrochloride, ammonium salts. Zinc nitrate is variously claimed to be worst of all (with reactive dyestuffs and optical bleaches) or better even than magnesium chloride (with certain vat dyes).

The effect of creaseproofing treatments on lightfastness of dyes has long been a favorite subject for AATCC Intersectional Contest Committees. The resulting papers have won four first prizes. In addition to providing useful data on selected dyestuff-resin combinations, the authors have theorized as to the mechanism of the reduction in lightfastness. Over the years the effect has variously been attributed to a formaldehyde reaction, to the action of N-methylol groups, to the action of free radicals generated by the resin, and to a phenomenon known as radiation antagonism.

The latter concept was first proposed in 1927 by a researcher at Eastman Kodak in connection with bleaching of yellowed nitrocellulose film. Light of one wavelength bleached out the color, whereas light of another wavelength restored it, the two actions being opposing or antagonistic.

This concept, applied to dyed fabrics, says that one component of light will cause fading, while another will restore the color. When the latter component is screened out, as for example by applied resin or reactant, the former will be unopposed and the fading will be intensified. If this be true, the the active agent in DMEU is the ethylene urea ring, since fading of sensitive dyes is accelerated by application of ethylene urea itself, in the absence of formaldehyde, catalyst, or cure *(15)*.

According to the free radical hypothesis, ultraviolet light absorbed by the dye causes hydrogen peroxide to form. This attacks the resin molecule, producing highly activated groups known as free

TABLE II. GENERAL PROPERTIES OF SELECTED RESINS AND REACTANTS

Type and Nearest Reference Number	Crease-Proofing Efficiency	Crease Recovery/ Strength Ratio	Durability (Alkaline Washing)	Chlorine Retention	Chlorine Damage	Yellowing on Chlorination	Yellowing With Heat	Fish Odor**	Lightfastness of Dyes
Urea Formaldehyde (Nos. 1, 2, 3)	low to high	average	fair to good	very high	high	none	none	moderate	good
Melamine Formaldehyde (Nos. 4, 5)	moderate to high	average	good to very good	moderate to high	moderate to high	low to high	none	low	fair
Cyclic Ureas									
Ethylene Urea (No. 6)	very high	sl. low	very good	low	low to high*	none	none	low	poor
Triazones (Nos. 12, 13)	high	average	good	low	low	none	low to mod.	mod. to high**	fair
Dihydroxy EU (No. 8)	very high	sl. low	very good	low	moderate to high*	none	none to low	low	good
Non-Nitrogenous									
Aldehydes (No. 24, 25)	very high	low	excellent	none	none	none	none to moderate	none	fair
Ketone-Aldehydes (No. 28)	low	low	fair-good	none	none	***	***	none	fair
Acetals (No. 29, 30)	low to mod.	low	excellent	none	none	none	none	none	fair
Epoxides (No. 31)	low	low	excellent	none	none	none	none	none	fair

*Becomes high after severe alkaline washing. **Not afterwashed. ***Some yellowing reported, but conditions not known.

radicals. These in turn reduce the dyestuff, causing it to fade *(15)*.

There may be several mechanisms that operate, depending on the particular dyestuff and the type of resin or reactant. The subject is exceedingly complex.

Concluding Remarks

The selection of a compound for a given end use can be a complicated undertaking, considering the large number of available compounds and the many end-use requirements. A single comparative trial will rarely tell the whole story, since application conditions may not have been optimum. A knowledge of the structure and expected properties can therefore be helpful not only in selecting the product but in getting the best out of it. It is with this thought in mind that the foregoing discussion has been presented.

No one compound is ideal for every use, as will be seen from *Table II*, which gives typical end-use properties for a few representative resins and reactants.

However, in most instances a product is chosen because it is outstanding in a few important properties, even though it may be average or even slightly deficient in others. Some years ago, dimethylol ethyleneurea came into widespread use because of its greater durability, ease of application, and chlorine resistance, and in spite of its higher cost and more severe effect on lightfastness of colors compared to previous types.

In today's market, the triazones have captured a large portion of the white-goods business, primarily because of their even greater resistance to chlorine damage. In the colored-goods market, a number of types are being used, many of them blends of undisclosed composition and variously featuring low cost, high efficiency, or no need to afterwash. In a few cases, straight UF resins are being used because of outstanding lightfastness as well as low cost.

No non-nitrogenous type has as yet attained an important commercial position, the complete freedom from chlorine damage being outweighed by low strength, low efficiency and/or high cost. However, some types are being used in blends with nitrogenous materials.

As research continues, the total number of available resins and reactants will increase. If past trends are followed, the bulk of the business at any given time will go to those products that most nearly meet current market requirements at an acceptable price. It is anybody's guess as to which type will be in widest use five years hence.

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A few reprints of this special report on Wash-and-Wear are available. For a copy, write to The Editors, TEXTILE INDUSTRIES, *806 Peachtree St., N.E., Atlanta 8, Georgia*

Four mixing tanks are located alongside the extractor-pad-drying range. The resin mix flows by gravity to a pump which delivers it to a pad, as shown in the diagram on the next page.

Resin Treating Cotton Knits

They now make up more than 90% of this plant's output

Staff prepared Exclusive

IN LESS than five years, resin finishing of cotton knits has grown at Rockville Processing Co., Rockville, Conn., from 30% to more than 90% of total output. During this time, as demand for permanent finishes increased, Rockville doubled its capacity and broadened its line of finishes for the wash-and-wear markets.

While resins impart a number of properties, their primary function is to control shrinkage. They represent the first chemical means of stabilizing the cotton fiber and thereby reducing shrinkage of the knitted fabric to a greater extent than is possible by fabric relaxation alone.

But the growth of resin treatment in the knit goods field can be attributed to other factors as well. First of all, machine knitting has always offered a fast and economical means of producing practical apparel fabrics. Among other properties of the knitted fabric, elasticity is most important in contributing to comfort in wearing. And this property can be modified to any desired degree by proper fabric design and careful control of knitting.

In recent years, improvements in machine design have made possible higher speeds, and have offered the stylist a wider range of textures and patterns of larger area. Moreover, not only are novel textures possible, but fabrics with structures and properties similar to woven fabrics can be produced.

From a finishing standpoint, equipment has been available for wet processing the tubular knit fabric, economically and on a production basis. This equipment was readily adaptable to the application of resins, and improvements in equipment design have been coming along for even more efficient finishing.

Rockville Processing Co.'s experience in resin finishing goes back to the early fifties, when resins were just being evaluated by the knitting industry. However, as commission finishers of tubular knit cottons their experience goes back long before this time. The practical know-how, which had been acquired in applying nonpermanent finishes and in controlling shrinkage, did not become obsolete by any means. There still is a need for sound finishing practices even though resins as a distinct class of chemicals call for newer finishing techniques.

Being commission finishers, Rockville resin treats a broad range of fabrics, of carded and combed cotton, mostly for the dress and sportswear fields. These fabrics are finished to meet customer specifications for type of finish, hand, strength requirements, and shrinkage.

The Problem of Dimensional Stability. The problem of controlling shrinkage is well recognized by the knitting industry. Its solution to the degree that has been achieved in woven cotton fabrics is yet to come. However, acceptable shrinkage is possible upon resin treatment, particularly if the fabric has been properly designed for end use and knitted with care.

But the benefits of stabilization by resin treatment can be offset if fabric dimensions are exceeded, either in width or in length, beyond the limitations of the fabric

and its design. Until a specific process is developed to control shrinkage to an exacting degree, the need for close cooperation between fabric designer, knitter, and finisher will continue.

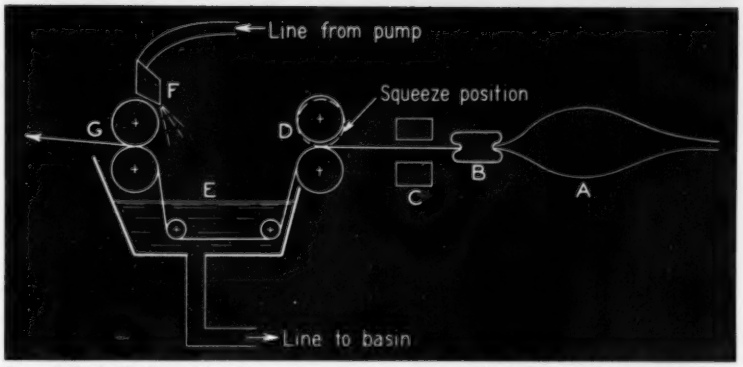
Applying the Resin. Resin formulations vary according to the versatility of properties desired. A typical resin formulation can impart at least the following properties: dimensional stability, anti-curling (to facilitate sewing), and crease resistance. An even more versatile formulation can impart wash-and-wear properties, together with spot and stain resistance.

There is on the market a wide assortment of resins and finishing agents to meet various requirements. However, cost is always an important factor in selecting resins, and compatability of the ingredients which make up a formulation is an important requirement. A typical resin formulation is applied to deposit 4-5% solids in the fabric.

The normal finishing routine at Rockville, which also includes the conventional steps required in processing the tubular knit fabric, is as follows:

1. Application of resin in extractor-pad-drying range.
2. Pre-setting, if necessary, to adjust fabric width before curing.
3. Curing in completely relaxed state for 2½ minutes at 310 F.
4. Matching—to correct spiraling effect of pattern which is created in circular knitting.
5. Calender finishing—to make final adjustments in width, to remove bow in pattern, to relax fabric by steaming, to remove wrinkles and smooth out fabric, and to wind up fabric for shipment. During this operation the fabric is also inspected.

Of equal importance to resin fomulation are application and mechanical handling of the fabric during processing. The fabric must be thoroughly wet out in resin impregnation and squeezed uniformly, while fabric width and tension are regulated to suit the individual fabric needs. Although Rockville's equipment has features which make for simpler and more uniform operation, attention must be given to each processing phase and to the specifications of each fabric finish.

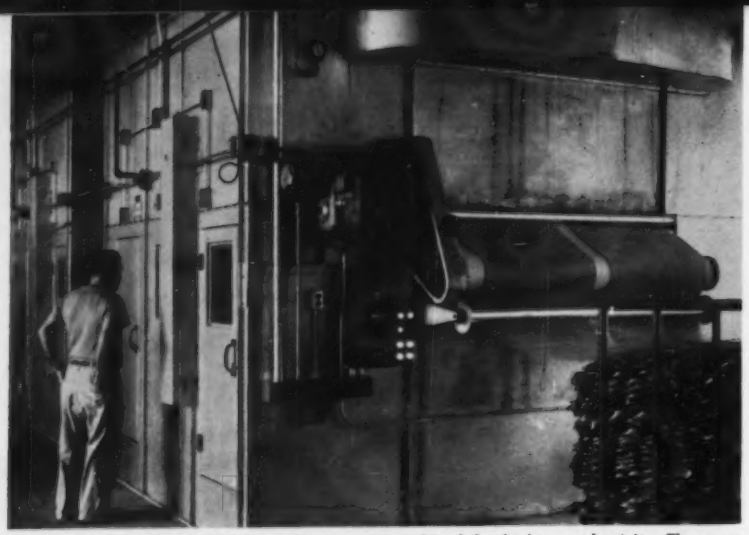


One of Rockville Processing Co.'s two ranges for resin application and drying is shown at top of page; its operation is shown schematically above. Normally, this process consists of passage through the resin bath and rear set of squeeze rolls (G). However, when the fabric requires stretching, it is steamed (C) after being brought out to width (A, B), and it is then passed through both sets of squeeze rolls (D, G). First set of squeeze rolls (D) is also used if the fabric is impregnated in the wet state. Resin liquor is circulated by pump from collecting basin to pad (F, E) and back again for cooling and for better application. At (A) and (B) the fabric is spread by internal spreaders, bows, and propellers. Edge drive rolls (B) can speed up or slow down the fabric edges, while the internal bow can be adjusted to put a resistance in the center of the goods to achieve a straight stripe. Tension is carefully controlled before resin impregnation and between padding and drying.

Equipment. Rockville's equipment and facilities for resin treatment, which occupies two floors of the plant, include two extractor-pad-drying ranges and a double-strand (steam-heated) curing range. In addition, there is an individual extractor-pad, a loop dryer, and a pre-setting machine.

Of particular interest is Rockville's curing range, where the fabric is set while in a completely relaxed state. It is overfed into the unit on a small, endless blanket. In this loose state it is carried forward on revolving wire-screen reels, while hot air is forced against it from above through small, closely spaced apertures.

In each heating unit (there are two in the range for higher productivity) there are two revolving reels so that each side of the fabric receives equal treatment. The force of the hot air serves to press



Two-strand curing range has two heating units combined for higher productivity. The range provides for controlled overfeeding, for relaxation during curing, and for cooling. Rockville's longer curing cycle—2½ minutes at 310 F—is most suitable for the wide range of fabrics processed, resulting in the least possible amount of strength loss in the fabrics.

Circular knitting creates a spiraling effect of the pattern; on a striped pattern the stripes run in a diagonal direction. These effects must be corrected before garment manufacture. In the matching operation, shown above, the tubular fabric is cut, the individual stripes are matched at the cut edges, and then the fabric is resewn in the new position.

This final finishing operation has several functions: adjustment of fabric width, straightening of bow in pattern, steaming for relaxation of fabric, and wind-up. Proper speed control of the finishing rolls and wind-up roll (which are independently controlled) is important in maintaining the proper fabric dimensions.

the fabric against the reel so that it is carried forward without tension. The range also provides for cooling of the fabric.

Precautions. During resin treating operations, a change in fabric dimensions occurs, depending upon fabric construction and upon the tensions, in length and in width, under which the fabric is held. As an example, a typical fabric measuring 66 inches in width after knitting, when processed by Rockville will show the following changes: After resin impregnation and drying, it will measure 62-63 inches; after curing, the loss may be as little as ½ inch, indicating the relaxed condition of the fabric during this operation.

Since there is little loss to speak of in curing, the fabric dimensions which are established before this operation can be regarded as permanent. This does not imply, however, that in resin impregnation and drying a fabric can be stretched or pulled excessively. Here a knowledge of fabric structures is required, together with practical know-how in handling fabrics. These dictate what is proper degree of tension and proper amount of stretching for each fabric. Some stretching is possible after curing, but this is not permanent as the fabric will return to its stabilized dimensions after laundering.

While there is some loss in fabric strength upon resin treatment, the inherent properties of the knitted structure, particularly its elasticity, are retained to a high degree. The principal tests carried out on the finished fabric are bursting strength and shrinkage upon laundering. Rockville finds that in most cases, resin treatment reduces fabric shrinkage by about 50%. In the case of fabrics with tighter structures, similar to woven fabrics, shrinkage can be less than 3% after laundering.

Rockville Processing Co. has taken steps through modernization and expansion to remain in the resin finishing field in a big way. Even though the problem of shrinkage may be overcome by some other means, Rockville management is confident that the wash-and-wear finish will continue to meet with approval.

Fiber Selection and Fiber Blending

by Sydney M. Cone, Jr.
Vice-President
Cone Mills Corp.

Exclusive

THE FEDERAL Trade Commission has listed sixteen generic names and definitions for manufactured fibers. These sixteen names are a part of the Rules and Regulations under the Textile Fiber Products Identification Act. That Act becomes effective on March 3, 1960. These sixteen names are: acrylic, modacrylic, polyester, rayon, acetate, saran, azlon, nytril, nylon, rubber, spandex, vinal, olefin, vinyon, metallic, and glass. Their definitions are omitted here.*

In addition to these 16 fiber families are the five important natural fibers: cotton, wool, silk, flax, and jute.

At the outset, let us be frank with our readers. We will make no effort to present detailed scientific data; we will append no footnotes. The science is available to us as well as our readers, but our subject is too broad to allow the detailed and painstaking pedestrian approach. A perspective is intended, and that is what we are trying to achieve.

*The definitions and the names of the companies producing each type of fiber were given in the chart, "Trademarks of Man-Made Fibers and Where to Get Them," which appeared in TEXTILE INDUSTRIES for August, 1959.—The Editors.

Look to the End Use. The first consideration for fiber selection should be the end use of the finished fabric. The finished fabric may be intended for an end use in the industrial field, in the household field, for clothing, or for some specialty. We would select the fibers by a different formula for each end use, just as we would select the weave and coloring and styling and finishing differently according to the end use.

There is a theory advanced by distinguished retailers that any fabric should be designed, colored, and finished for any end use. To follow such a theory is to court madness.

After establishing the end use of a finished fabric in order that we may select the proper fibers to achieve the proper end use performance, we find it helpful if end use performance can be pinned down with a set of specifications. Such end use performance specifications are available in many areas. The Armed Forces have come a long way in developing performance data; many industrial fabric consumers are equally clear about what they want the fabric to do for them.

The National Retail Merchants Association has been backing a somewhat more ambitious program of performance requirements. A side comment on these end use specifications is that testing apparatus and testing procedure does not necessarily correlate with actual wear. To the extent that laboratory apparatus fails to correlate with actual wear, we have an opportunity for error in the fiber selection and fiber blending before our fabric ever gets out of the mind of the planner.

Nevertheless, the more detailed our consumer makes his requirements, the simpler it will be for the fiber selecter and blender to put the fibers together, for the spinner to spin them, the weaver to weave, and the finisher to finish.

The addition of sixteen families of manufactured fibers to the five important families of natural fibers has enlarged the importance of three schools of experts. These schools are: (1) The school that believes it is possible and practical to specify the fibers, and therefrom predict the behavior of the fabric made from those fibers. (2) The school of experts that handles the blending of the fibers and carries them through the spinning, weaving, and finishing processes to the finished article. (3) The school of experts that analyzes the finished article for the purpose of determining where the product went right or wrong.

It will be helpful to follow the activities of each of these three schools.

School of Experts No. 1. It is

possible and practical to choose fibers that will give us a fabric meeting specific end use requirements. We can point to many successes. The successes are more numerous when we begin with fibers that are compatible chemically. But many of our twenty-one fiber classes are *not* compatible chemically. Cotton is compatible with caustic soda, and wool is not; cotton is water-absorbent, Dacron is not. Cotton can be colored with a variety of dyestuffs, hydrophobic manufactured fibers are largely resistant to dyes. They can however, be modified in the manufacturing process by built-in dye-receiving cells, and these cells can be added wherever necessary.

There is a great difference in cotton's natural twist and the manufactured twist that has to be imparted to the synthetic fiber when it is designed to blend with cotton. Staple length is a detail; some of the manufactured fibers can be chopped to a staple length compatible with the natural fiber and others are resistant to such treatment. Nevertheless, the manufacturer has succeeded in taming his product and making it amenable to the blend for which a use has been determined.

These practical, detailed problems are not always known to the school that specifies the fibers and predicts the behavior of the fabric. All too often the fibers are unfriendly and do not mate and do not end up in the kind of fabric that, theoretically, they should have produced; nor is this disappointment always a result of a blend of different fibers. Very often, variations in the fiber itself can cause disappointments.

The fibers *do* vary within themselves. This is more particularly true of the natural fibers than of the manufactured ones, but no fiber can be taken entirely for granted. They have their individualities, and like people, they require a large amount of personal attention.

The English used to store their cotton in dark warehouses for a year to condition it and get it used to the thought that it was going to be processed into fine yarns. The marriage of fibers with each other, and with others, requires a great deal of patience, understanding, and human sympathy.

School of Experts No. 2. Let's assume that our School No. 1 has provided us a staple length, a fiber width, a degree of twist, and chemical affinities compatible with all the other fibers in the blend. School No. 2 now takes up these fibers for the purpose of putting them together and making them into yarn and cloth and a finished article.

Can School No. 2 really achieve a perfect blend of the fibers that have been selected for the finished article? What tools are at their disposal? They can use certain blending machinery and equipment, but this equipment is a far cry from the blending that is available, for example, in your kitchen. You are dealing with fibers and not with liquids.

Visualize the bale-breaker of the ordinary cotton mill trying to achieve a mix of the cotton fibers from different cotton bales, and you get a pretty rough picture. The equipment must be modified from the original cotton mill system so as to provide a more adequate mixing machinery. These machines have been developed, and a reasonably adequate mix can be achieved.

If the mix can't be achieved in the raw fiber form, it can be done at the card, or it can be done with sliver by mixing slivers together at the drawing frames. The methods of mixing are various and not entirely perfect. We are agreeably surprised, though, at the end result to find that the mixing has been achieved within a very fair tolerance. It may be somewhat more difficult to prove that each inch of yarn contains the same formulation within the fair tolerance. Some very interesting scientific work is being done in this area of controlling the mix and patrolling the mix.

School No. 2 must concern itself with contamination. The spinning room and the weaving room are likely sources of fabric contamination by fly from neighboring spindles or looms. These fibers are so different from each other that a little bit of the wrong fiber twisted into the wrong cloth can produce a sizable defect in the finished article. Any single spinning room or weaving shed contending with a variety of these fibers is guarding against an unanticipated blend.

School No. 2 then proceeds with the finishing of the blended fibers, and it is to be hoped that the fibers are chemically compatible so that the finishing can be achieved with a minimum of operation. It might be very expensive, for example, to have to dye three kinds of fibers by three different dyeing methods.

This is a convenient spot to mention the costing department. These fibers don't all cost the same amount of money. They have to be put into a fabric that must be merchandised at a price. In the processing, a certain amount of loss occurs. It was estimated, for example, that a certain woolly fiber was reduced from 20% of the total fabric to 5% of the total fabric through the finishing process, and this amount of loss has to be allowed for in the costing.

It is to be expected that the cost department would have a good deal of influence on the choice of fiber to start with, so as to limit the amount of leeway that School No. 1 can indulge itself, in its choice of the ideal combinations.

This is where the cotton farmer has his real opportunity. Of all the fibers available today, cotton is among the cheapest of those plentifully available. Cotton can be chemically and physically modified to compete with the performance qualities of its sixteen manufactured fiber competitors. The cotton fiber, assisted by the cost department, and by the chemist, is a very active competitor in all the fields of end use. Temporarily displaced in certain areas, it is anticipated that cotton will fight back vigorously and successfully for its traditional markets.

The simplicity of the single fiber operation has a great deal to recommend it. The addition of chemical finishes to single-fiber fabrics can influence the single-fiber fabric to perform to the same degree that the mixed-fiber fabrics were expected to perform.

We come, then, to look very much closer at simplifying our mixtures rather than complicating them, and settling for simplified mixtures. With this simplification we are more likely to avoid the

inexplicable and the unpredictable as dramatized by the movie "The Man in the White Suite."

School of Experts No. 3. This leads us to consider the third school of experts—those who analyze the finished article to determine whether the product went right or wrong. It is amazing to review the number of eccentricities that have been uncovered by actual end use of these blended products.

Many of us older people are wondering how our bodies are going to adapt themselves to the various new medicines that are being swallowed, or injected, into us. We might get some clue to this question by observing the eccentricities of our well-planned blended fabrics. It is not my purpose to specify any particular detail, for reasons which may be a matter of good taste, but some of our best planned blends have gone haywire in contact with unexpected gases or other new chemicals or static electricity.

Once the hazards have been boldly faced and overcome, we come out with a perfectly splendid range of improved fabrics for the Kings and Queens of Main Street, U.S.A. The luxury of the hand, the brilliance of the style, the beauty of design, and the essential wearability of the material is a revolution which the silk worm—symbol of past luxury—may well view with amazement.

Economic effects of wash-and-wear cottons

by Frank D. Barlow, Jr.

Abstract*

■ THE INTRODUCTION of wash-and-wear cottons has produced a chain reaction in the fiber-fabric-clothing industry, repercussions in the world of retailing and laundries, and a fallout of mixed blessings for producers and consumers alike.

Happily, every man, woman, and child who wears clothing stands to gain from wash-and-wear garb—either in less labor for its upkeep, in neater looking garments, or in lower home laundering costs.

These were some of the conclusions of an economist who analyzed the effects of this recent development in the textile industry.

The market potential for wash-and-wear cottons has been multiplying ever since the spring of 1955 when several major textile firms started producing resin-treated cottons in volume, first for clothing and more recently for household items. The importance of both of these uses can be measured both in dollars and cents and in greater freedom from housework.

Take shirts, for example. The cheapest shirt to buy is an untreated one. But if laundering costs are also considered, it's something else again. If the housewife counts the time she spends starching and ironing the shirt—and figures her time is worth a dollar an hour—it will cost her $16 to launder the untreated shirt before it is thrown away. The shirt now has a total cost of $19.95.

On the other hand, she will spend only about $2 of her time laundering a wash-and-wear shirt that originally cost $4 or $5. So, if time is money to the housewife, the wash-and-wear shirt will look like a bargain to her.

Laundering ease is just one of the advantages gained through the innovation of wash-and-wear fabrics. Resin-treated cottons resist crushing and wrinkling far better than untreated cottons. They don't shrink as much and hold their shape better.

Manufacturers who only a year or so ago were skeptical of the new resin finishes for cotton now find they either produce easy-care cottons or their fabrics don't sell. To meet the competition, textile men face more capital expenditures, more technical supervision, and more responsibilities—with the hope of more profit.

The possibilities of wash-and-wear have also pushed the textile finishing industry into increased activity. In 1958, about 2 billion yards of cotton textiles were treated with resins. The experts guess that by 1960 the total may well be 3½ to 4 billion yards, or about two-thirds of the broad-woven goods now being finished for apparel and household uses.

There are still some problems in making the finished garments live up to public expectations. But textile manufacturers are quick to point out that, if garment makers and consumers pay attention to instructions on how to use the treated cloth, easy-care clothing will perform as advertised.

As might be expected, commercial launderies have greeted wash-and-wear clothing with no great enthusiasm. Preliminary reports, however, show that these firms have not lost as much business as they feared. But they are going to have to find new ways to launder the treated fabrics if the consumer is to get the most out of his wash-and-wear garments.

Research already has been undertaken by the drycleaning industry to determine whether it's possible and practical to resin-treat garments within their plants. This work has been sponsored by the National Institute of Drycleaning, in cooperation with USDA scientists of the Agricultural Research Service. Results show that resin treatments are not only technically possible but economically feasible.

Manufacturers of home laundry equipment are also coping with the problems of handling easy-care cottons. They are busy developing automatic machines that will wash resin-treated cottons gently, yet still get them clean.

Meanwhile, the customers aren't waiting. They want wash-and-wear cottons, and they want them now. And the industry—from the textile mills to the retail stores—is trying to meet this consumer demand.

*From an article appearing in the September, 1959, issue of *Agricultural Marketing*. The author is an agricultural economist in the Marketing Research Division, Agricultural Marketing Service, U.S. Department of Agriculture, and is stationed at the Southern Regional Research Laboratory, New Orleans, La.

Wash-and-Wear: Where to?

Quality in easy-care can't be obtained through careless and carefree procedures

The wash-and-wear properties of the acrylic fibers are demonstrated by these Acrilan jer-

by George F. Richardson
Chemist in Charge of Finishing Development and Quality Control Bradford Dyeing Association (U.S.A.)

Exclusive

A GENERATION ago the concept of a smooth-drying woven fabric would have been a fantastic dream. However, with the advent of synthetic fibers this idea became a reality. During the last few years the dream became a nightmare for a few plants as they experienced growing pains in this field, but the concept has produced the textile revolution which is called "wash-and-wear."

The reasons why some fabrics dry smoothly are not completely understood, but certain factors are known to play a part. Among these are crease resistance and crease recovery, both dry and wet. Crease resistance is the tendency of a fabric to resist excessive deformation; crease recovery is its ability to eliminate distortions and approach its normal smooth appearance.

Clearly, any goods which exhibit a high degree of wet crease resistance will tend to remain smoother during laundering and rinsing, while fabrics which show high wet crease recovery will smooth themselves during drying. Those with dry crease recovery will tend to eliminate deformations after the drying has been completed.

In view of these factors, fibers which exhibit a high degree of dry and wet crease and wrinkle recovery may produce fabrics with minimum-iron properties, provided the constructions of the yarns and cloth are suitable.

There are two fundamental groups of fibers which can be considered for wash-and-wear fabrics. One of these consists of the fibers which have inherent crease recovery. The other group includes those fibers which do not normally have a high degree of recovery but lend themselves to chemical treatments which can impart these properties. The former group is exemplified by some of the hydrophobic synthetic fibers and the latter by the cellulosic fibers. The chemical treatments which have been successfully employed on the cellulosics involve either application of resin finishes or chemical modification of the cellulose.

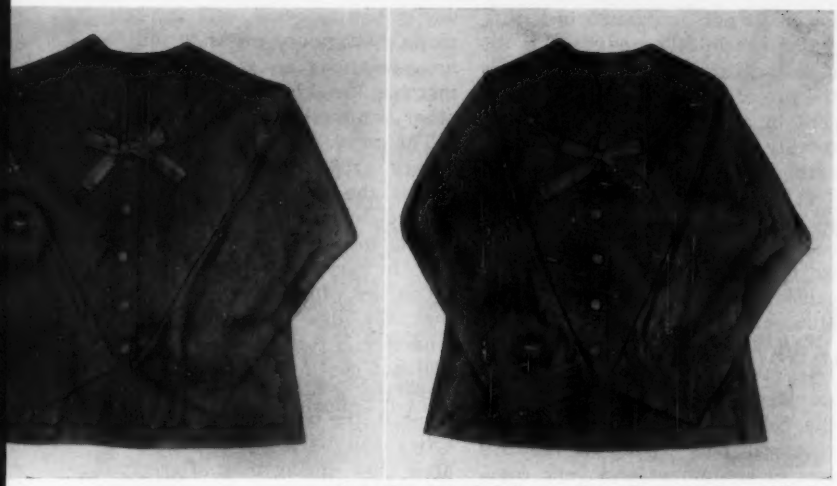
The three basic methods of producing a wash-and-wear fabric, then, consist of:

1. The use of certain hydrophobic synthetic fibers.
2. The resin treatment of cotton or rayon.
3. The chemical modification of cotton or rayon.

Before examining these methods, it should be emphasized that yarn and fabric constructions play a vital part in the production of a wash-and-wear fabric regardless of the method used. The best results are usually obtained when relatively long staple fibers are spun into soft, moderately twisted, singles yarns and woven into relatively open, medium-count fabrics. In general, it may be said that yarns and weaves which contain a minimum of internal strains and stresses give the best results, provided they exhibit sufficient tensile strength.

The Synthetics for Wash-and-Wear. The use of hydrophobic synthetic fibers is the oldest method of creating a true wash-and-wear woven fabric. The polyester fibers (such as Dacron, Terylene, and Kodel) and the acrylics (Orlon, Acrilan, etc.) are effective for this purpose and have been used extensively for their minimum-iron properties. These fibers exhibit very good inherent dry crease recovery and, since they absorb extremely small amounts of water, this tendency is still evident in the wet state.

Fabrics woven from these fibers show permanent shrinkage control, minimum-care and wrinkle recovery properties. In addition, they possess high tensile and tearing strengths and wear well because of their good abrasion resistance. Unfortunately, they do have shortcomings in that their hydrophobic character causes them to retain static electricity and, since they do not absorb perspiration, they are somewhat less com-



Soy blouses. Blouse on the left is the original, before washing. Blouse in the middle has been washed once, while blouse on right has been laundered 50 times in an automatic washer.

fortable to wear than the natural fibers.

Some of these disadvantages may be minimized by blending these synthetics with the natural fibers or rayon. In many instances there is much to be said for blends, but great care must be taken in selecting the fiber ratios, designing the yarns and fabric, and in dyeing and finishing.

Resin Treatment of Cotton. The second basic method of producing a minimum-care fabric involves resin treatment of cotton goods. The foundation for the process is a properly designed and carefully prepared, clean fabric. This method, which has caused some textile finishers to get prematurely gray, consists of careful selection of the resin or resins, accurate preparation of a well-balanced finishing mix, application to the fabric, drying, baking, after-washing, redrying, and other normal finishing operations.

Many types of resins have been used on cellulosic textiles but not all are suitable for white wash-and-wear merchandise. Urea-formaldehyde resins are economical but lack the required durability, and fabrics treated with them show excessive strength losses when chlorine bleached and heated. The melamine-formaldehyde products are more durable to laundering, but they also retain chlorine which causes yellowing.

There are, however, several other resin types which show merit and have been used or are now being investigated. All of these resins cause an appreciable reduction in tensile and tearing strengths and in abrasion resistance.

The first of these was *dimethylol ethylene urea* (DMEU), which has been extensively used in wash-and-wear cottons. This resin is capable of producing good minimum-care properties, is durable to home laundering, and is not yellowed by chlorine bleaching. The strength loss due to chlorine bleaching and heating is very low if the finish is properly formulated and thoroughly cured. However, the chlorine resistance is lost after several severe launderings. Furthermore, the highly acidic sours used by some commercial laundries will strip the resin from the fabric, with resultant loss of wash-and-wear properties.

The *epoxy resins* have attracted some attention because they impart very durable minimum-care properties and are not chlorine retentive. However, they are characterized by a relatively low dry crease recovery and require a powerful catalyst and high solids add-on. The latter factor makes them somewhat more expensive than the other commonly used resins.

The cost can be reduced and a good result obtained by finishing the fabric with a combination of epoxy and DMEU resins. The resin that is obtained is not a simple mixture of the two products, but it does possess a reasonably satisfactory combination of the properties of each. It imparts durable resistance to chlorine degradation but still requires the use of a somewhat hazardous catalyst.

Triazone resins have also met with favor for use on wash-and-wear whites. They produce good minimum-care properties on cotton with very low chlorine degradation and are more resistant than DMEU to acid souring. Triazone-treated cottons can be bleached white with hypochlorite but they tend to yellow at high temperatures and develop "fishy" odors unless they are thoroughly washed after baking.

Triazine resins also give good minimum-care properties on cotton with low chlorine degradation. Their resistance to removal by acid souring is approximately the same as that of the triazones and they are less susceptible to scorching and odor development than the triazones. Straight triazine resins have a tendency to yellow when subjected to chlorine bleaching and therefore cannot be bleached white. This characteristic has been minimized in recently developed modified triazine products.

The modified *glycol acetal resins* are relatively new-comers to the wash-and-wear field. They impart minimum-care properties, relatively good abrasion resistance, and very good resistance to acid souring and chlorine retention. The glycol acetal resins, however, produce less dry crease recovery than the other resins commonly used for wash-and-wear cottons.

Two new resins have been developed for use as wash-and-wear finishes for cotton. One is based on tris (1-aziridinyl) phosphine oxide, which is called APO, and the other 1,3-bis (hydroxymethyl) -tetrahydro-5-hydroxy-2(1H) - pyrimidinone or DMHP. The APO treatment results in wash-and-wear properties which are very resistant to acid scouring and the fabric is not damaged by chlorine bleaching.

APO is expensive and somewhat hazardous and must be handled with extreme care. The properties of the DMHP finish are substantially the same as those produced

with dimethylol ethylene urea, except that the chlorine resistance is not lost after multiple severe launderings.

None of these products is a cure-all for the production of wash-and-wear cottons but they represent a tremendous amount of excellent research and it is certain that new modifications of these products as well as new products will be developed in the future. In most instances, the resins used on today's easy-care cellulosic fabrics are carefully balanced blends of some of the resins mentioned.

Chemical Modification of Cotton. The third basic method of producing wash-and-wear fabrics is the chemical modification of cellulose. It is sometimes difficult to draw a line of distinction between this method and resin treatment.

The chemical modification consists of reacting the fabric with organic compounds which cross-link with the hydroxyl groups of the cellulose. The cross-link is usually a relatively short alkyl group and the process is characterized by an absence of polymerization. Although the resin treatments may also involve cross-linking with the cellulose, they consist of treatment of the fabric with resin-forming monomers followed by polymerization *in situ*.

The chemical modification of cellulose can be obtained through the use of alkyl compounds which contain two halogen atoms, preferably terminal, capable of reacting with two cellulose hydroxyl groups. The process tends to tie together pairs of cellulose molecules, thus adding some rigidity to the molecular structure and causing the fabric to resist or eliminate distortions.

The reaction is commonly carried out in the presence of a caustic alkali which serves to swell the cellulose and to catalyze the reaction. This treatment requires special equipment and very complete and careful control to assure the optimum degree of cross-linking and a minimum of undesirable side reactions.

Like resin treatment, the chemical modification method results in a substantial reduction of the tensil and tearing strengths of the fabric. The effects of this treatment are much more evident on wet goods than on dry. Consequently, the wet strengths are generally lower than the dry strengths, and the wet crease recovery is substantially higher than that of the dry material. Indeed, this finish is characterized by low dry crease recovery, and the fabric is much more prone to mussiness in use than wash-and-wear merchandise produced by the other two methods.

The very high wet crease-recovery produced by this method causes the creases and wrinkles formed during washing to fall out during the drying process and results in very good wash-and-wear properties. In view of the fact that the dry crease recovering tendency is rather low, the fabric will not continue to smooth itself after the drying is complete. As a result, the wash-and-wear properties will be found to be better after slow drying than after rapid drying. This finish may, therefore, give lower wash-and-wear ratings than the other methods if garments are tumble dried rather than line dried. The dry crease resistance of this finish can, however, be increased by combining it with a resin finish.

Each of the methods has its advantages and shortcomings, and none is the perfect path to the ultimate in wash-and-wear textiles. All are, however, very valuable tools, which will continue to find employment for the particular end-uses for which they are best suited. The synthetics and modified cotton give the best durability, synthetics the strongest fabrics, and resin-treated cotton usually the most economical and versatile wash-and-wear merchandise.

It is certain that quality cannot be attained in easy-care textiles by careless and carefree procedures. However, the millions of yards of high grade, minimum-iron fabrics which have been sold is mute testimony to the capabilities of the modern methods. The goal of perfection in wash-and-wear has yet to be achieved, but it is being sought daily by diligent textile chemists.

Unless someone devises a method of irrigating cotton plantations with formaldehyde solution and raises wrinkle-resistant fibers, it is probable that the above three basic methods, or modifications and/or combinations of them, will continue to be used for the creation of the wash-and-wear fabrics which have earned new respect for the textile industry.

AATCC focuses on wash-and-wear

■ THE TECHNICAL program at this year's AATCC Convention includes a symposium on wash-and-wear, to be presented on Thursday morning, Oct. 8. Papers scheduled:

1. "The Consumer's Point of View," by Genevieve M. Smith, Textile Laboratory, Sears, Roebuck & Co.

2. "New Developments in Evaluating Wash-and-Wear Performance," by James R. Bercaw, Textile Research Laboratory, Du Pont Co.

3. "Progress in Wash-and-Wear Wool," by John F. Krasny and John Menkart, Harris Research Laboratories.

4. "Man-Made Cellulosic Fibers in Wash-and-Wear," by A. B. Hilton, G. V. Lund, and A. E. Martin, Jr., Courtaulds (Alabama) Inc.

5. "Retrospect and Prospect: Progress and Problems in Wash-and-Wear," by Prof. Pauline Beery Mack, Texas State College for Women.

In addition, the entry of the Association's Washington Section in the annual intersectional contest is titled "'Wash-and-Wear' Ratings: Subjective and Objective." The paper discusses the various methods for subjective evaluation of wash-and-wear properties, and compares them with each other and with an optical, objective method.

The correlation between the various subjective methods was fair. A good correlation was found between the objective and subjective methods.

The subjective methods all showed wide variations between raters, while the objective method exhibited excellent reproducibility. However, the optical method was influenced by construction and color.

Such an objective method appears to be best suited for comparison of various wash-and-wear treatments on one fabric, or for quality control in textile finishing.

The 4 Devils That Plague Wash-and-Wear

by Sidney D. Blue
Textile Consultant—
Director of Fabrication
Finished Goods Division
Reeves Brothers, Inc.

Exclusive

WHEN DAVID did battle with Goliath, when Horatio thwarted his enemies at the bridge, and when St. George tilted successfully with the Dragon, they established themselves for all time in the annals of heroism.

No less a heroic event took place in 1957 when the finishing industry accepted the greatest challenge of its long history. In that year it announced to the housewives of America the perfection of a new finish which promised to emancipate them forevermore from the worst drudgery of home laundering—the ironing of their husbands' white dress shirts.

Unfortunately, in their enthusiasm to lead the way into this new wonderland, the proponents of this new finish did not fully foresee the problems that they would encounter in fulfilling this promise.

The purpose of this article is to examine each of the four major problems that have arisen, and to suggest possible solutions. To appreciate the difficulties to be resolved it is important to remember that no cotton garment has more demanding performance requirements than a man's dress shirt.

Problem No. 1 — Dimensional Stability. A shirt is the only man's garment which is sold in accurate dimensional sizes. Therefore, the fabric from which it is made must have dimensional stability. Shirt neck sizes, which are related to body measurements, run in ½-inch steps from 14″ to 17½″, and sleeve lengths in 1″ steps from 32″ to 36″. Thus there is a total of forty possible size combinations, and the average cutting scale contains twenty-five of these size combinations.

The purpose of setting up this comprehensive size program is to insure as close to perfect fit as possible, and it presupposes that the consumer can expect the fit to last as long as he wears the garment. Therefore, the fabric that goes into the shirt must be shrinkage controlled within prescribed tolerances.

In the case of a wash-and-wear fabric, latent shrinkage is built into the cloth by stabilizing it with resin after the fabric has been held to unnatural physical dimensions. It has become standard practice to set the finished width at 44½″ on a fabric of 46″ grey width. A 60-pick broadcloth is finished with a pick count of 57-58, a lineal stretch gain of 3% to 5%. This result obtains after compressive shrinking.

All is well and good as long as the full resin stabilization lasts. Unfortunately, many of the resins being used are subject to complete stripping in one or two commercial launderings when acid sours are used. When this occurs some radical shrinking can and usually does take place and this will, of necessity, affect the shirt size. For example, a 3% to 6% lineal shrinkage causes a loss of ½″ to 1″ in collar size and 1″ to 2″ in sleeve length.

Some resins lack stability and start to hydrolyze with the first washing. They continue this process of hydrolysis progressively and at an accelerating rate so that by the sixth or seventh washing there is no resin left to stabilize the dimensions of the fabric. Progressive shrinkage takes its toll.

A cure for this plague is the use of a resin or a system including a resin which is immune to acid sour and resistant to rapid hydrolysis. The epoxy resins are undamaged by acid sours or chlorine and are quite permanent under all laundering conditions. Other resins that are less stable are generally needed with the epoxies to augment crease recovery. If the additive resins are eventually broken down, the cloth will still be dimensionally stable because the epoxy will remain.

The triazone resins are adequately resistant to acid sours and are quite resistant to chlorine damage. The resulting finish is sufficiently durable to maintain dimensional stability through the lifespan of the garment.

Problem No. 2—Fabric Stamina. The average life of an untreated white dress shirt is forty washings. Usually it is refreshed by laundering after each wearing. The consumer will expect the wash-and-wear dress shirt to withstand the same amount of laundering. This unusually rigorous treatment demands a fabric of exceptional stamina in tensile strength, tear strength, and abrasion resistance.

A white shirt is bound to encounter hypochlorite bleaching to a greater degree than any other garment. Consequently, it is obvious that the only resins that should be used are those that are

non-chlorine retentive or, at least, highly chlorine resistant.

Since all existing resins create fiber embrittlement and tensile strength degradation, the only present cure for this problem is to alter traditional fabric constructions so as to build in added strength where it is most needed.

For a generation the standard white dress shirt fabric has been the 136 x 60 combed broadcloth. This cloth is made with 40s single warp and filling and disposes 71% of the fiber content in the warp and 29% in the filling when finished. The filling grey tensile strength in a cloth of this construction averages about 42 lb. Any resin treatment that produces crease angles of 250° (Monsanto method) will cause tensile strength degradation of 40% to 50%, and the result at best would be a 25-lb filling break, which is the minimum acceptable, down to 21 lb, which is too low. Since the break for desirable stamina attributes is 30 lb, it is evident that a fabric with this filling construction cannot meet adequate requirements.

Another disadvantage of the traditional broadcloth is that its unbalanced composition has an adverse effect on the crease resistant mechanism. A dense fabric is inferior to a relaxed fabric. For example, an oxford (88 x 50) is in effect a square cloth (about 40 x 50 on an interstices basis, finished) and performs much better than broadcloth. The same is true of other medium-weight square constructions.

It is evident, therefore, that broadcloth is a poor basic construction for good wash-and-wear performance, but it would be folly to expect the consumer to readily accept another fabric. Fortunately the construction can be altered considerably and still look like broadcloth.

For example, a broadcloth made 136 x 68 with warp yarns of 45s and filling of 30s will preserve the broadcloth appearance and at the same time relax the warp density, increase the filling strength and distribute the fiber content more equally (60% warp and 40% filling). The resin distribution will follow the fiber balance and it follows that the maintained crease resistance in a cloth of this construction will be more nearly equal in both warp and filling directions.

A broadcloth of this construction will have a grey break of about 64 lb in the filling and, after resin treatment, will be well over 30 lb. The filling tear strength will be increased about one-third over the traditional cloth.

The proposed construction will also be more abrasion resistant in the shirt for the following reason: The collar and cuffs of a shirt fol-

low the warp in the length of their dimensions. Therefore it is the filling yarn that is sharply creased and exposed over the turned edges of the collar and cuffs. These are the edges that are most subject to abrasion during ordinary wear, in the wash wheel, and especially in a bone dry condition in a tumble dryer. The heavier filling yarn and additional picks in the new construction contribute to the solution of the abrasion problem.

Problem No. 3—Comfort Factor. The dress shirt is unique in another respect. It is designed to fit the wearer snugly at its terminal openings—the collar and cuffs. Therefore it should be made of a fabric that is hydrophilic at least to the extent of providing a fair degree of wicking action so as to evaporate body moisture. At the

same time the fabric must be more hydrophobic than one that is untreated so that the fibers will not absorb so much water internally that the quick drying feature will be lost.

The simple cure for this problem is to use a porous fabric. While this may be acceptable to a minority during the summer months, it is by no means the answer to the problem. The lighter warp broadcloth which has been suggested is a distinct improvement if broadcloth is to be used, but there is room for the development of fabric constructions that will "breathe" and yet not be of the "peek-a-boo" mesh variety.

Another field for experiment in this area lies in the possible use of cotton and viscose blends where the total resin add-on can be lowered. This would increase the absorptive property of the fabric and still achieve the same crease recovery.

In such a blend a collateral advantage would be that the lower addition of solids would decrease fiber embrittlement and thus improve the abrasion resistance. Experiments along these lines are now being conducted using the new dimensionally stabilized viscose fiber.

Problem No. 4 — Crease Recovery. The shirt occupies still another role uncommon to any other garment. It is at the same time an undergarment. It is an undergarment in that it is worn under a coat or jacket, and it is an outer garment at the collar and chest "V" opening. In this dual role it is subjected to torsion and bunching stresses not encountered by any other garment.

The exposed neck portion of a shirt becomes the focal point of a man's complete attire. Any mussing in this area is fatal to good grooming.

Steady progress is being made in solving the crease recovery problem by tailoring the resins to fit this special purpose, or by using combinations of resins, or by a better choice of catalysts. Crease recovery angles of 260° to 280° (Monsanto method) and four to four-plus appearance performance are now possible. The difficulty lies in the fact that these results are only possible at the expense of considerable fabric stamina degradation.

The cure for this problem is probably two-fold. One constructive step lies in redesigning fabrics

to build in more strength without adding the discomfort factors of greater bulk or density. This can be done without noticeably altering the general appearance of fabrics in consumer demand.

Another possibility for obtaining greater and more durable crease recovery lies in the employment of the new stabilized viscose fiber in a blend with cotton. Such a blend may afford more complete cross linking with a lower concentration of resin than would be required on an all-cotton fabric. Thus some of the negative results which occur with high level resin applications would be avoided.

Potential Profit For All. So far the consumer has been very patient in his role as guinea pig for the industry. The major reason for his tolerant attitude toward performance failures to date is his wife's fervent desire for true wash-and-wear performance.

The man who wears dress shirts to business five days a week buys five shirts per year. Approximately 84,000,000 dress shirts will be produced this year and of this total about 75% will be represented as wash-and-wear garments.

Only 50% of the shirts with "Wash-and-Wear" labels will be laundered at home. The balance will go regularly to commercial laundries. Although the 31,000,000 wash-and-wear shirts that will be laundered at home can be ironed easily and quickly and will stay fresh looking longer, they will wear out faster and will be far less comfortable on humid days than a shirt made from an untreated fabric.

At an average cost of $3.20 per garment the amount spent for an annual shirt wardrobe is $16.00. For the shirts that are sent to a commercial laundry the annual upkeep cost will be about $48.00. In other words, three times the original cost of the garment is spent for laundering.

An approximate breakdown of the $64.00 annual bill that the consumer pays for the cost and maintenance of five shirts follows:

Grey goods mill	$ 3.20	
Finisher (untreated finish)	.50	
Shirt manufacturer	5.90	
Retailer	6.40	
	$16.00	$16.00
Laundry		48.00
		$64.00

A few cents more for a finish that will really perform and a few cents more for a fabric of greater efficiency will be willingly paid by the consumer. For example, $1.00 more per shirt, or a total of $5.00 more per year, would be a small increase to pay if the $48.00 laundry bill could be eliminated or drastically reduced.

The known technology at present has been almost static for the past year. Improvements have consisted of minor refinements in known ingredients or finishing methods. Maybe we have been going through a period of great laboratory research that will bring forth the "break through."

If a new finish can be developed that will completely solve all of the present problems and provide the consumer with true wash-and-wear shirts, there is an opportunity for the industry and the consumer to participate in the division of the savings of a great part of the several hundred millions of dollars that are now spent on commercial laundering.

Perhaps too much research is being devoted to methods of production that will lower the cost of present resins, and not enough effort is being devoted to developing resins or other systems that will produce greater efficiency of performance in the garment.

Russians inspect U. S. wash-and-wear

■ RUSSIAN scientists announced last year that the drip-dry shirt had just been invented—in Russia, that is. But during the recently concluded American National Exhibit in Moscow's Sokolniki Park, an American housewife gave daily demonstrations to the Russian public that wash-and-wear clothing is a fact of every-day life in the U.S.A.

The photograph at the right shows Mrs. John Jacobs of Alexandria, Va., with Tom Conroy of New York City, giving visitors to the model apartment a close-up of how Dacron, Orlon, and nylon wash-and-wear clothes come from the dryer ready to wear.

All of the clothing that Mrs. Jacobs washed and wore at the Exhibit is commercially available in this country. The most expensive items in her family's wardrobe—hers and her husband's suits—retail for less than $45.

In addition to doing her family's washing, Mrs. Jacobs cooked, baked, washed the dishes, and cleaned the apartment with Russian spectators looking over her shoulder.

The modern five-room apartment, equipped with late model appliances, was designed for a family with a yearly income of about $12,000. It was part of the exhibition depicting a cross section of modern life in America.

The Problems of Washing Wash-and-Wear

Some manufacturers are still using chlorine-retentive finishes on chino trousers. The damage pictured occurred after the trousers were washed, then bleached for stain removal.

Promoted primarily for handling at home, wash-and-wear garments often go to the laundry—and the textile finisher's mistakes sometimes make the customer unhappy

by Norman Duckworth
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Seal Laboratory
American Institute of Laundering

Exclusive

THE introduction, development, and use of wash-and-wear cotton and the promotion and problems that have surrounded it have been watched by the professional laundry industry with keen interest. This special interest by the industry and its trade association, American Institute of Laundering, might be surprising to some, since wash-and-wear has been slanted primarily for home care.

However, the professional laundry industry is a billion-dollar-a-year business that handles the washing for more than 12 million American families. Any fabric, any product, or any other service that might affect the professional laundries' volume—either adversely or positively—is of tremendous interest to the Institute and its members.

This interest began two years ago when some wash-and-wear cottons were tested in A.I.L.'s Certified Launderable Seal Laboratory. The interest grew as wash-and-wear began appearing on the market and found its way into professional laundries.

While manufacturers were submitting wash-and-wear articles to the Seal Lab for approval in the realm of colorfastness, non-shrinkage, and other desirable qualities, and while A.I.L. was working to promote completely launderable wash-and-wear fabrics, member laundrymen were also sending in wash-and-wear garments to the Institute's Fabric Analysis Laboratory, seeking information on the proper care and handling of these so-called "miracle" garments. With this double impact, A.I.L. focused attention on the field of wash-and-wear cottons.

A technician in the AIL's laboratories examines two wash-and-wear blouses that were chlorine retentive. The resin finish in the blouses absorbed chlorine, which could not be rinsed out. When the garments were pressed, acid was released, destroying the fabric. Chlorine retention, which still exists today, was one of the first and most serious problems met with wash-and-wear garments.

Claims Were Exaggerated. When wash-and-wear first hit the market, many manufacturers and finishers realized the advertising claims were highly exaggerated, and that they could not be backed up by testing. Furthermore, there were no tests or standards agreed upon by the industry. Unfortunately, and perhaps because standards were so badly needed, some were published that at first glance seemed satisfactory. In reality, they were as vague as some of the ad writers' claims.

The Institute had reservations concerning some of these early standards because:

1. Some called for only a very few hand launderings.
2. Warm or cold water washings were advocated, but no temperatures were specified. Soiled garments will not become clean at low temperatures.
3. Classifications were too general and vague.
4. Many did not incorporate enough testing.
5. "Do Not Bleach" instructions were accepted and advocated.
6. Vagueness of tests for appearance, ratings, and acceptance were prevalent.

Many of the problems encountered in the early wash-and-wear cottons were the result of confusion and the lack of information on acceptable standards and tests. Because wash-and-wear originally was directed toward the housewife, the majority of the testing that did take place covered only home laundering. The possibility that any of these materials might be sent to the professional laundry was, in a good many cases, never even considered.

On some of the laboratory's shopping tours, A.I.L. personnel were even told by some manufacturing representatives and sales clerks that the materials should not be sent to a professional laundry because "they will ruin them." If manufacturers could not expect their materials to withstand even home washing machine methods, they then recommended only hand laundering.

Hangtags became a must, with detailed—and often confusing—instructions. For example, some hangtags on white cottons showed statements such as "Completely Washable" in large lettering; then, "Do Not Bleach" would appear in small lettering. It is common knowledge that white cottons must be bleached to retain whiteness, under either home or professional laundering conditions.

One hangtag, in particular, was considered a classic. On this booklet appeared the phrase, "This garment may be bleached if necessary." In large red letters, the first line on the next page read, "Do Not Bleach."

Instructions printed on the collar of one shirt said, "Do Not Bleach," "Do Not Use Detergents," "Do Not Starch," and "Do Not Spin or Wring." The instructions ended there, but one wondered at this point whether a potential buyer might not suddenly say to herself, "Do Not Buy."

At the same time that special laundering and handling instructions were being given on hangtags, seemingly miraculous claims were being made via radio, newspaper, and TV in advertising wash-and-wear. These ads, taken at their face value, gave the impression that if the articles were merely passed through a basin of cold water, all soil would magically disappear and the shirt or garment would be ready to wear in two or three minutes—completely dried and finished, without a hint of a crease, wrinkle, or pucker.

Many women quickly found that it did not work out this way. Many men who were familiar with professionally laundered shirts rebelled at the thought of wearing some of these early cotton wash-and-wears. Naturally, the shirts made their way to professional laundries.

Shortcomings of Wash-and-Wear. While wash-and-wear was thus going through its "growing pains," the Institute's labs continued their testing. The Seal Lab found that the majority of faults in the original wash-and-wear cottons fell into the following categories:

1. Chlorine retention.
2. Graying or developing a "dirty color" with repeated laundering.
3. Whites turning yellow upon prolonged exposure to ordinary light.
4. Turning greenish during the souring operation.
5. Picking up bluing.
6. Loss of wash-and-wear qualities after only a very few commercial launderings.
7. Tendency to pick up grease and to discolor.
8. Offensive odor.
9. Low tensile strengths.
10. Low abrasion qualities.
11. Low tear strengths.
12. Progressive and excessive shrinkage after repeated laundering.
13. Attraction of lint.
14. Interlinings that created trouble either by becoming yellow or by shrinking excessively.
15. Seam puckering which ruined the appearance of an otherwise good fabric.
16. Garments made from mixed lots which might have a sleeve or panel that was chlorine retentive, while the balance of the garment would be satisfactory.
17. Chlorine retentive trim, decorative materials, and accessories, such as buttons.

Of course, not *all* garments had *all* the faults listed.

The A.I.L. Standards. Today, after approximately two years of the cotton wash-and-wear, many of these problems have been eliminated. Much test work has been done, many changes have been made, and standards have been set—standards that do have some meaning.

Seal Laboratory standards for cotton wash-and-wear are perhaps more rigid than most, but are based on tests that have been found necessary for consumer satisfaction and acceptance. They have helped in bringing wash-and-wear cotton garments to a state of more complete launderability.

Due to such rigorous testing and firm standards, we are able to show a contrast between the wash-and-wear cottons available today and their ancestors. "Ancestors" may seem a rather odd word, but, in the opinion of the Seal Laboratory, the better cotton wash-and-wear articles available today are so different and have changed so much from the best of the original output that such a word is most descriptive.

One of the most serious prob-

When metal pants creasers are used in place of pressing, more "shrinkage" appears. Pants creasers add even more horizontal stretch, rather than lengthwise stretch from pressing.

lems encountered was chlorine retention. It has been known since the mid 30's that urea formaldehyde resins react with sodium hypochlorite, both under home and commercial laundering conditions, to form chloramines. With complete high temperature drying, as in pressing, hydrochloric acid forms and cellulose is degraded. With melamines, yellowing may occur under the same conditions, but without serious cellulose degradation.

This problem proved to be one of the first faults observed with early cotton wash-and-wear and was one of the most serious. A chlorine retentive resin finish, as understood by the Institute, is one that under conditions of normal commercial laundering and finishing, or stain removal treatment and finishing, causes damage to the fabric.

To determine whether a wash-and-wear cotton contains such a finish, two methods are used by the Seal Laboratory. One is an accelerated test, using 15 times the normal amount of 1% available chlorine bleach (normal laundry concentration) at a temperature of 160 F. The other is the "regular" test which consists of 20 actual commercial launderings, including finishing, using sufficient hypochlorite to produce an initial concentration of 100 parts per million of available chlorine. The number of launderings (20) was decided upon as the result of findings gained from working with the original cotton wash-and-wear and to determine the effect of repeated laundering.

The Institute was very active in attempting to get such harmful resins off the market. While complete success has not yet been accomplished in all fields in this respect, great strides have been made.

And, as a result of the repeated testing for chlorine retention, many of the other problems listed were discovered—and many have since been eliminated.

Discoloration of white fabric (developing a "tattletale gray" or a "dirty shade" after a number of launderings), which was common, has practically been eliminated in present day cotton wash-and-wear articles.

Many garments showed progressive and excessive shrinkage. The laboratories found samples showing shrinkage of 1 to 2% up to approximately three or four launderings. The same fabric after eight or ten launderings, would show 3 to 4%. After 20 launderings, some shrank as high as 9 or 10%. In a marked-size garment or shirt, this excessive shrinkage made the garment unserviceable. This fault has been practically eliminated today.

Many Problems Have Been Solved. As a result of cooperation between chemical manufacturers, finishers, and fabric manufacturers, new resins began to come into the market rather rapidly. However, as some faults were corrected others appeared. Still more changes were needed to correct these new faults. Some manufacturers were quick to drop the urea based resins to get away from the chlorine retentive problem, only to run into a yellowing problem. This, too, has been corrected for the most part with present day resins.

Some resins turned yellow from sunlight. This problem has almost been eliminated today, also. Turning green from the souring operation is no longer a problem. While the picking up or "hogging of the blue" from the bluing operation has not been completely corrected, it is not as serious a problem as it once was. The loss of wash-and-wear properties after a few high temperature washings has been minimized.

The absorption of grease from oily loads and soiled work seems to have been practically eliminated in present resins.

The yellowing and progressive shrinkage of interlinings has been corrected.

Lint attraction of the cotton wash-and-wear, while not completely solved, is a known fault and much work is being done to correct this problem.

Seam puckering is another fault that has not been completely solved, but much work is being done and great progress is being made.

Odor is no longer a problem with proper methods of resin application. Tensile strengths have been brought up to acceptable minimums. Fabric construction has been changed in many cases to correct this fault. Low abrasion resistance of some of the early wash-and-wear garments has been improved in many cases.

Low tear strengths have also been improved. Actual wear-wash tests with many of the present wash-and-wear shirts, for example, indicate that many will give wash-and-wear garments has not been treated with resins. This was certainly not true of the average wash-and-wear cotton shirt when it first appeared on the market.

Garments containing one panel or one sleeve of a chlorine retentive fabric no longer form a major problem, though it was rather serious due to the cutter mixing his lots as the change from chlorine retentive to better resins was being made.

The same situation is true of chlorine retentive trims. While chlorine retentive accessories have never been a major problem, they do turn up every so often. Recently, a nurse's wash-and-wear cotton uniform showed damage along the button strip. When tests on both the uniform fabric and interlinings showed them to be a non-chlorine retentive fabric, the buttons themselves were tested. The plastic buttons proved to be chlorine-retentive. At each pressing of this button strip, hydrochloric acid fumes were released, attacking the

fabric and thread around the button. After a very few launderings, the uniform was unserviceable.

Some Problems Remain. While great strides have been made in improving cotton wash-and-wear fabrics and garments, it is unfortunate that some of the standards have not kept pace. Many standards have not been revised to meet these new developments. For example, recommending warm or cold water washing for home machines or any type of laundering will not remove many oily based stains, or perspiration stains, or odor, especially from white materials.

Classifications are still rather vague in some instances. Many laboratories are giving approval on only a very few washings. Some still do not include tests for resistance to light, crease recovery, and tensile and tear strengths. On colored materials, some standards do not include tests for washfastness, bleeding, crocking, or resistance to perspiration.

Some laboratories have seen the need and have adopted appearance rating standards that are more practical.

The Seal Laboratory has standards which we believe are complete. However, while the standards for Seal certification are up-to-date and complete, they are "current" standards. New tests and changes may have to be made if conditions change.

It is quite obvious that improvement has been made in cotton wash-and-wear materials since they first appeared two years ago. Much has been learned—many problems have been corrected. These changes did not come about overnight. Time, money, research and cooperation were required.

Many people resist change, so do many companies. Sometimes it is difficult to convince any segment of the textile trade that policies are incorrect. Chemical houses supplying the resins, manufacturers weaving the fabric, finishers applying the resins, cutters making the garments, ad men writing the ads, the retailer selling the material or the laundrymen servicing wash-and-wear—all have to be considered.

None of these people knowingly tries to make a bad product or a false statement. The reverse is true. Because they do believe in what they are doing, it becomes that much harder to convince them. Some of this has happened with wash-and-wear. Each was sure that he was right, but it soon became evident that changes were needed and that they would come about only through cooperation of all concerned.

Changes will always bring problems. As old ones are corrected, new ones arise, many times as the direct cause of change. The case of collar and cuff interlinings may serve as an example. Because shirting manufacturers were finding it difficult to get interlinings in collars and cuffs that would not be chlorine retentive or turn yellow and that would be quick-drying, strong, and wrinkle free, they began to explore the possibility of using synthetics. Some manufacturers did begin using nylon or Dacron. Unfortunately, many of these shirts using these materials have caused consumer complaints.

Both nylon and Dacron must be heat-set. Normally, these heat-setting temperatures are well over 350 F. However, on a number of the shirts, apparently the heat-setting was not done properly. At each pressing, the interlining in the collar and cuffs contracted. After a few launderings, the contraction of the interlining resulted in extra face fabric in these areas so that the collars could not be finished without having wrinkles appear. The problem can easily be corrected if properly heat-set nylon or Dacron interlinings are used. There are also cotton and nonwoven interlinings available that are satisfactory for wash-and-wear cotton shirts.

The Problem of Shrinkage. Another wash-and-wear problem is currently causing concern. It results from the fact that less touch-up is needed in wash-and-wear. The original wash-and-wear garments produced were primarily drip-dry but required at least some ironing, especially along the seams. Today, more and more of these wash-and-wear items are being sold with finishes that can be safely tumble dried. Sewing techniques and seam construction make possible a very slight touch-up.

For the past season or two, cotton slacks made of material similar to work clothes fabrics have become popular with college and high school groups and for casual wear. Matched sets in polished chinos and twills with wash-and-wear finishes are being used more and more. Prior to wash-and-wear, such garments required pressing and finishing; now they are tumble dried because of wash-and-wear claims.

Complaints have arisen regarding excessive shrinkages, especially in the leg length. The problem seems mysterious, for the same fabrics are being used, the same pre-shrinking treatments are being given, washing methods are the same, cutting patterns are the same as have always been used. Why, then, the complaints?

The Seal Laboratory looked into the problem, knowing that the methods used to finish garments can have a great bearing on the fit. Testing showed that the drying methods have caused these complaints in many cases. To show how important the finishing operation can be, note the tests in *Table* 1 (next page). The garments were the same in every respect.

Note Garment No. 1 and the measurements after one laundering and pressing. Compare this (line 2) and the measurements after wearing (line 4.) There is little or no change. Similar results show after three launderings and pressings (line 6). However, notice what happens to the same trousers, after only one tumbler drying cycle (lines 10 and 11), a common method of finishing these materials. Interestingly, notice that when the same trousers are wet out and again finished by pressing (lines 12 and 13), shrinkage is again satisfactory.

In comparison, note Garment No. 2. These trousers, after one laundering and tumble drying, show shrinkages comparable to sample No. 1 when finished in the same way. Note what happens when the trousers are wet out and pressed (lines 6 and 7). Compare this with line 4, which are the measurements taken of the trousers after tumble drying and

wearing. Pay particular attention to the shrinkage and measurements of the side length and inseam as compared to the waist.

The waist showed a shrinkage of 5.9% after one laundering and tumble drying. After wearing, however, that shrinkage had dropped to 3.0% because of the stretch, or recoverable shrinkage, as a result of wearing. After being wet out and pressed, the same per cent of shrinkage (3.0%) showed because the pressing had given the stretch. However, notice the leg measurements after tumble drying —leg shrinkage was 5.5% (line 3) in the length and 5.0% in the inseam. After being worn there was little change in these two areas.

These leg measurements did not stretch, as did the waist, because there was no tension applied lengthwise to the leg during wearing. These shrinkages would cause complaints. However, after pressing, stretch is introduced. There is a noticeable difference and no complaints would be registered.

Here, then, is a problem that requires education and more cooperation. If the garments are tumble dried, areas that get no tension in wearing, such as the lengthwise measurement of the leg, may cause shrinkage complaints while other areas that do get tension (waist) will cause no complaints.

Placing a pair of trousers on metal pants creasers, as is often done by homemakers, will not help the situation. In fact, more leg shrinkage may be noticeable. The tension on these pants creasers will bring about horizontal stretch.

It must be understood and remembered that when shrinkage guarantees are given (for example, "1% shrinkage") the measurements for this total shrinkage are taken after pressing.

TABLE 1. Effect of Finishing Operation on Wash-and-Wear Trousers

	Waist	Back Length	Side Length	Inseam
Garment No. 1				
(1) Original, In.	34.25	18.12	41.25	30.25
One Laundering				
(2) Pressed, In.	33.25	17.87	41.00	30.25
(3) Shrinkage, %	2.8	1.3	0.6	0.0
(4) Worn After Washing, In.	33.25	18.00	41.12	30.25
(5) Shrinkage, %	2.8	0.6	0.3	0.0
Three Launderings				
(6) Pressed, In.	33.00	17.75	40.75	30.00
(7) Shrinkage, %	3.6	2.0	1.2	0.8
(8) Worn After Pressing, In.	33.50	18.50	41.00	30.00
(9) Shrinkage, %	2.1	0.6	0.6	0.8
Four Launderings				
(10) Tumble Dried, In.	32.25	17.25	39.25	28.75
(11) Shrinkage, %	5.8	4.8	4.8	4.9
(12) Wet Out, Pressed, In.	33.50	17.75	40.75	30.12
(13) Shrinkage, %	2.1	2.0	1.2	0.4
Garment No. 2				
(1) Original, In.	33.25	18.00	40.75	30.00
One Laundering				
(2) Tumble Dried, In.	31.25	17.00	38.50	28.50
(3) Shrinkage, %	5.9	5.5	5.5	5.0
(4) Worn After Washing, In.	32.25	17.75	38.63	28.50
(5) Shrinkage, %	3.0	1.3	5.2	5.0
(6) Wet Out and Pressed, In.	32.25	17.75	40.00	29.63
(7) Shrinkage, %	3.0	1.3	1.8	1.2
Three Launderings				
(8) Tumble Dried, In.	30.75	16.87	37.50	27.63
(9) Shrinkage, %	7.5	6.2	7.9	7.9

Chlorine Retention Again. Another problem may be experienced this coming fall and winter season with the same materials. Many finishers are using the cheaper types of chlorine retentive resins in these fabrics. This is being done for two reasons. One is cost. The other is because the materials are colored.

Manufacturers realized that colored materials should not be bleached. However, it must be remembered that these materials often must be bleached for stain removal and because of the type of soiling received by casual wear. When a chlorine retentive resin is used, damage will show up at the first handling. One manufacturer is very conscious of this and is using non-chlorine retentive resins on chinos, etc.

Much has already been accomplished in the field of cotton wash-and-wear through cooperation. Too much emphasis cannot be placed on the idea of meetings between the widely separated segments of the textile industry. Meetings between finishers; manufacturers; the maintenance industry, both laundry and drycleaning; and retailers have been started. Much has been done in explanation of each other's problems. It is evident that problems have been worked out during the past two years that cotton wash-and-wear has been on the market. Acceptance is better, sales are greater.

However, while improvements have taken place, there are still some to be made. Members of the laundry industry are working toward the same goal as the finisher, the manufacturer, the cutter and the retailer—a happy and satisfied customer. The Certified Launderable Seal Laboratory of American Institute of Laundering will continue to watch with interest new developments in the field of wash-and-wear. As in the past, only the articles that are completely launderable and pass the Seal's rigid tests will receive approval and will be promoted as completely washable, for the Seal signifies "the best in washables."

Combed yarn mill's simple opening line provides

better cleaning, less variation

Staff prepared
Exclusive

THE opening room of one prominent, 35,000-spindle southern cotton mill is currently operating ten FC-10 cotton feeders to good advantage. Each is fed directly from bales and delivers approximately 125 pounds per hour through a Junior cleaner and onto a covered horizontal conveyor.

Stock is delivered to horizontal cleaners and taken from there directly to the picker room to be condensed and fed to the picker hoppers. This arrangement, which has operated successfully and economically for several years, offers two major advantages:

(1) Improved cleaning for the combed-goods mill (only high-grade cotton is run in this line)

(2) Reduced yard-to-yard picker lap variation

The old opening equipment included conventional feeders and one horizontal cleaner running today's poundage. Today's arrangement gives a blend that is evidently better in yarn strength and quality.

Light signals on the feeders indicate when the stock is "out of level." The system is simple, easily maintained, and combines more capacity with less floor space than formerly was used. Additionally, it features sealed, anti-friction bearings throughout, flanged pulleys to guide the aprons, low initial cost for volumetric feeders, and high-speed aluminum combs.

TOP PHOTO: View from the feed side of the opening line showing four of the ten FC-10 feeders. Note high-grade cotton in right foreground. BOTTOM PHOTO: Delivery end view of the entire line. Note in foreground the inclined cleaning unit attached to each feeder and the covered conveyor onto which stock is dumped by feeders. The two horizontal cleaners which receive the stock from the two opening lines are visible at the extreme left in the center of the photo (note duct which conveys stock from them to picker room on floor above).

Fluflon runs about 60 hours between doffs. The spindle speed is about 36,000 rpm, and a package that weighs about 14 ounces is produced.

TEXTURED YARN SUCCESS STORY

How a fast-moving company became an important factor in a changing market

Staff prepared—Exclusive

■ THE CAROLINA THROWING CO., Kings Mountain, N. C., is the creation of W. K. Mauney, Jr., a 20-year veteran in textile operations. In December, 1954, Mr. Mauney decided that the time was ripe to start a throwing mill, since textured yarns had become such a large factor in the textile market.

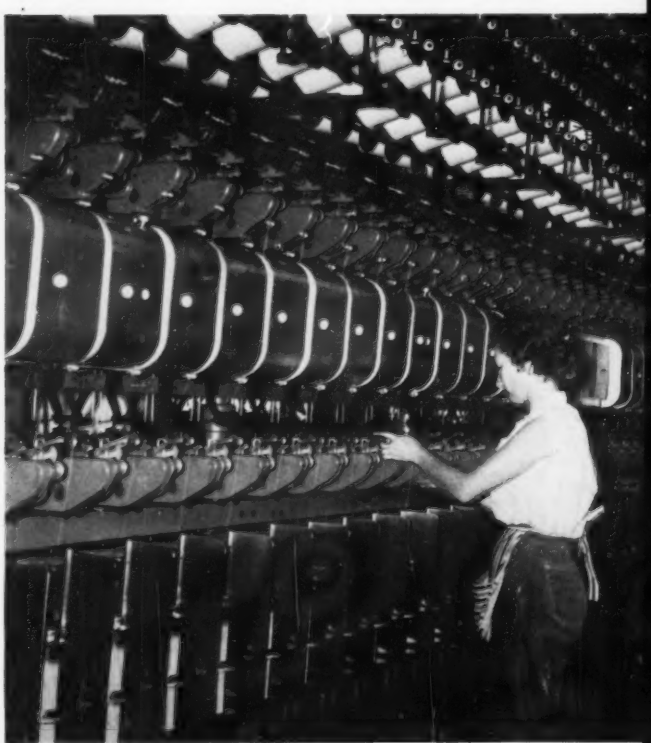
Howard B. Jackson and Carl F. Mauney joined in forming the company early in 1955. The first step was the purchase of 12 Fluflon stretch yarn machines. At that time stretch nylon yarn was selling for about $4.90 per pound, and of course Mr. Mauney had his sights set on some of the profit waiting to be had.

His first disappointment came in August 1955 when he made his first pound of nylon Fluflon stretch yarn and found that the market had already dropped to $3.25 per pound.

In January, 1958, 100 spindles for Saaba (reprocessed Fluflon or Superloft) were installed, followed by another 100 spindles in September to get into the sweater market.

The company prospered until the summer of 1958, when management found that it was no longer feasible to operate with only 12 machines. After several months of research work, it was decided that it would be much better from an over-all standpoint to increase the size of the company by about the same amount as before. Additional machinery was purchased and at this writing the company is producing approximately four times as much stretch yarn as it produced at the start.

IN JANUARY 1959, 432 spindles of conventional



Saaba yarn is put up on a 1¾-pound package. The spindle speed is about 2,800 rpm, and running time per doff is about 14 hours.

Superloft were installed. The following June these spindles were changed to 424 spindles of high-speed Superloft. The mill is now getting almost twice as much Fluflon off the same spindles, because spindle speeds were approximately doubled.

The sweater market is going well, and Saaba yarns are moving progressively, according to Mr. Mauney. The Fluflon machines produce about four times as much of the same type and denier of yarn as is made in this plant on Superloft machines.

Spindle speed is now 142,000 rpm on Superloft, and production is about 1,500 pounds per week per machine on 70-denier high-bulk stretch yarn. This is used in men's stretch socks, leotards, upholstery fabrics, bathing suits, and ladies' lingerie.

This fast-moving company is now well into the throwing business with 4,824 throwing spindles and a total of 6,000 spindles in operation, for a total investment of about $621,000.

IN FLUFLON operations, single ends of raw nylon from pirns are fed through, then doubled on Model 10B doublers (one end S and one end Z twist). Next, the yarn is coned on a Model 50 coner, ready for shipping.

For Saaba, Fluflon-processed yarn is used, bulked and doubled in the same operation; then it goes to the coners.

On Superloft, operations are the same as on Fluflon.

The new mill building houses 21,000 square feet of floor space, and about one third of this is used for warehouse and storage. The plant is completely air

The Fluflon and Superloft processing routes call for combining one end of "S" twist and one end of "Z" twist on Model 10B doublers.

In both the Fluflon and Superloft operations, yarn is wound onto 1¾-pound cones, on Model 50 coners, is then ready for shipping.

W. K. Mauney, Jr., observes the Superloft machine. Speed is about 142,000 rpm;—the two-pound package runs about 55 hours per doff.

conditioned, with an air wash system for both humidity and temperature control.

Management philosophy at Carolina Throwing can be summed up: "If we produce we must have the latest machinery developments, management and manufacturing techniques, and marketing know-how." Management watches for developments and gets improvements at the earliest possible delivery, according to Sam H. Stallings, Jr., general manager. Right now the market looks strong, new end uses are anticipated, and constant experimentation is under way here to keep abreast of the times.

"If we continue a planned program of experimentation with a good quality control program, the future of stretch yarn production in this plant is assured," Mr. Stallings said. "We have no regrets about entering the throwing business."

Clinton Jolly, superintendent, believes in hiring unskilled personnel and training them in the desired techniques to obtain the best results. A training program is in progress continuously.

In the last several months, this company has seen the need for more complete and extensive quality control and so has hired additional operatives for the sole purpose of controlling quality. The company has recently installed the latest testing equipment and methods in order to insure the very highest quality yarns possible.

Approximately half of the 1,100 delegates attending were textile industry representatives.

Leadership emphasized at Blue Ridge industrial relations meeting

Staff report

■ HELPING the supervisor better understand his management responsibilities was the theme of the 40th annual meeting of the Southern Industrial Relations Conference at Blue Ridge, N. C.

Principal emphasis during the conference was on the supervisor as the "man in the middle" in industry; the man responsible to top management and employees as well for the most effective production. The four-day conference featured twelve outstanding speakers who touched upon the supervisor's place in the South's new growth.

Dr. James L. Brakefield of Birmingham, Ala., told about 1,100 delegates attending the meeting that young men in management should keep their eyes on the South. Dr. Brakefield extolled the industrial potential in the South and the opportunities for a career in management that walk hand in hand with this potential.

Kempton Dunn, industrial leader, explained to the group that leadership is the ability to guide or conduct others who follow willingly, without coercion. A leader must have the attributes of competence, courage, and integrity, he indicated.

Competence implies knowledge of the job and the ability to analyze all the factors and to arrive at a workable conclusion or plan. People will not follow a man if they don't think he knows his job.

Courage implies decisiveness, a willingness to make decisions and to take risks. It also implies a willingness to stick by these decisions, and to accept responsibility for their results.

Integrity implies scrupulous fairness and impartiality and complete honesty. People will not follow a man they don't trust.

Competence, courage, and integrity are the basic qualities of leadership but they do not make a leader without the vital fourth attribute of communication to put the others into effect, Mr. Dunn emphasized.

Among the outstanding Southern businessmen and executives newly appointed to serve three-year terms on the board of directors of the Southern Industrial Relations Conference are: *Erwin R. Lehman,* vice-president, West Point Manufacturing Co., West Point, Ga.; *Morris M. Bryan, Jr.,* president, Jefferson Mills, Jefferson, Ga.; *J. C. Cowan, Jr.,* vice-chairman of the board, Burlington Industries, Inc., Greensboro, N. C.; and *Howard B. Carlisle,* personnel director, Lyman Printing and Finishing Co., Lyman, S. C.

Wage incentives a problem?

Points to consider in choosing and running a wage incentive system

by Robley D. Stevens
Management Consultant

Exclusive

MANY EMPLOYERS in the textile industry use incentive plans as a method of payment by which employees receive extra pay for extra production. Irrespective of a plan, consideration must be given to the base rate for the job, the amount of work required to earn the base rate, and the relationship between extra work above the base and extra pay for the extra performance.

Many authorities agree upon certain basic principles in the operation of an incentive plan: First, it must be easy to understand, simple and efficient to use. Second, it must inform management on the effectiveness of production. Third, rewards should follow employee effort as soon as possible.

Is your management doing all it can to make an incentive plan profitable? To answer this question management must consider many factors.

More Production. An incentive wage plan should be designed to encourage the fullest use of employee ability and thereby to increase employee productivity. Generally, such a plan will enable employees to increase their earnings by exceeding specific standards of output. It establishes a norm of output or production per man-hour and provides for wage payment on output in excess of this norm.

It is true that incentive wage plans vary from a simple price-per-piece program, commonly referred to as piece-work, to a very intricate and complex method of calculation. But the employee earnings under an incentive wage plan should be geared directly to his own productivity, or to the performance of a group or team of which he is a part, or to the performance of the entire mill.

The simplest form of incentive wage payment is straight piecework, whereby the employee is paid a fixed amount per piece produced. Under some mill plans, employees received a base rate and an additional sum for each added unit or piece produced above an established norm or standard of production.

Unlike individual incentive plans, under which individual earnings fluctuate with individual output, group incentive plans tie an individual's earnings to the output of the group as a whole. Piecework plans are often converted into group incentive plans by the pooling of individual earnings. Many plans are generally established for mill jobs on which measurement of individual output is difficult and the incentive earnings are based on the performance of the group as a whole.

The group incentive plan on a mill-wide scale came into prominence during World War II. This type of plan was usually easier to install and simpler to administer than most of the individual and group plans. In general, under such a plan all employees in the mill receive a percentage bonus for the mill output above standard.

Opposition to Plan. Some of the resistance to incentive plans is due to past experience with rate-cutting and the speed-up. The charge is made that whenever an employee became adept at an operation and increased his output, management would re-time the job.

Naturally, textile mill manage-

"The simplest form of incentive wage payment is straight piece-work . . . "

"Group incentive plans tie an individual's earnings to the output of the group as a whole . . . "

"Some of the resistance to incentive plans is due to past experience with . . . speed-up . . . "

ment generally favors incentive wage plans because it is assured of a relatively stable unit labor cost and greater employee efficiency and productivity. It seems unfair to pay the same wage to a less efficient employee as to a more efficient one, and a system which rewards the individual employee according to his skill and industry is therefore both more desirable and more equitable.

Mill management must reserve the right to change rates on the ground that piece rates cannot be permanent and that some flexibility is necessary where continuous changes in product and production methods take place.

Regular Method of Payment. If a plan has been the subject of dispute or negotiation, management should specify the form of payment that is to be used or stipulate the conditions under which changes are to be made.

Where the incentive wage plan is applied to only a part of the mill, the disparity in earnings between incentive and nonincentive employees may create unrest and even dissatisfaction, particularly where the day workers service the incentive production employees and work beside them in the mill.

The executive who handles the incentive wage plan should be something more than the standard concept of a salesman in the textile industry. He must use research methods, and pinpoint the principle of incentive wage payment in the mill to achieve profitable employment.

One policy to make clear is that clerical and supervisory personnel are not to be included under a incentive wage plan, since their productivity cannot easily be measured in terms of output.

If mill wages are paid on a time basis or a straight piecework basis, employees usually have no difficulty in determining their earnings. Under some plans, however, the computation of earnings may be complicated and employees often complain that they have no way of checking the calculation of their pay. In order to meet this objection, mill management may decide to furnish the incentive employees with a monthly statement of earnings, along with an explanation of the method of computation. In any event, the use of a piecerate or incentive system involves the problem of determining the proper rate per piece or unit of output or the determination of mill production standards.

In measuring productivity, however, mill management will set the rate, put it into effect immediately or after a specified trial period, and then handle any protest over the accuracy or justice of the rate.

Some mills set up special procedures for setting and revising rates, specify the conditions under which rates may be changed, and provide that rate changes shall be proportionate to the change in job content.

Safeguards on Earnings. Probably the most common protection

"Under some plans . . . computation of earnings may be complicated . . ."

is a guaranty against changes or cuts in existing mill rates unless there is a bona fide change in job content or method of operation, or if it is demonstrated that a clerical error was made in calculating the original rate. Some mills, therefore, regulate the conditions under which rate changes may take place; others indicate in general or in detail what changes in job methods or content are to be considered for restudying the job with a view to revising the incentive rate. Still others prohibit changes in rates once they have been set and approved by management, and also specify that changes in rate shall be commensurate with the change in the nature of the job or that only that part of an operation which has been changed shall be re-timed.

A common method of assuring mill incentive employees minimum earnings is the establishment of a guaranteed minimum wage, below which the earnings of no incentive employee can fall. However, employees subject to the Fair Labor Standards Act who are pieceworkers must be paid the statutory minimum of $1 per hour as set by the law.

Many mills insist that rates be given a fair and reasonable trial period before such rates are considered permanent. The length of the trial period is, on the other hand, a matter of concern to employees in that any undue delays between the beginning of an operation and the setting of a rate might result in some loss of incentive earnings.

Other mills adjust employee earnings under a variety of conditions, such as when working on faulty material or when machinery breaks down, when doing a special job, when waiting for work, or when the work is new or experimental.

Time Studies and Standards of Production. Whether mill wages are computed on a time or an incentive basis, there is usually some formal determination by management of the output expected of employees on each operation. This expected production is commonly called the work load or production standard and represents the amount of work required or expected to be done in a given time by the average qualified employee under normal conditions, with due allowance made for rest periods, fatigue, machine stoppages, material shortages, etc. In practice, it may be expressed in terms of expected units of output per hour or per day, or in terms of machines to be operated at some standard rate of efficiency.

It goes without saying that production standards in the mill are commonly determined through time study, i.e., by determining the time normally required to perform an operation in a test run. Or the mill production standards may also be based on past experience or production records.

The method of determining the mill standards upon which the wage is based is as important as

the method of payment, whether time or incentive. Because of the vital interdependence between production standards and incentive wages, the extent that time study is the proper method to use to determine mill job assignments and work loads, management must ultimately decide.

Management must be aware if the timing is of a mill employee with a record of high speed and productivity, because an average employee might find this difficult to attain. In any event, mill employee work load may be determined by the number of machines he must tend or operate as well as by the number of units he may have to produce.

The simplified time-study system makes it possible for mill management to control employee performance and adhere to delivery schedules. Comparisons with past months or years or with other mills indicate whether time study is the best method.

There is no doubt that the overseer or supervisor in a mill must also know whether or not the employee who is under time study is a superior, average, or slow worker. Frequently the skills of mill employees vary according to the nature of the job, but the production record will show this.

Summary. A well conceived wage incentive plan will lower mill costs because of increased productivity, and provide an opportunity to the employee of skill to earn money in excess of the base rate and in proportion to individual effort.

While it may be a formidable task to examine and measure all results from a mill incentive wage system, it simply boils down to this: Like any other management tool, a plan can be over-rated or misapplied, but its proper use can result in profits for the mill.

Ask Wool Bureau which dyes to use for Si-Ro-Set process

■ THE WOOL Bureau is prepared to provide, without charge, information and assistance to mills supplying all-wool fabrics to clothing manufacturers treating garments with the Si-Ro-Set permanent pleating and creasing process. The Bureau has arranged to have suppliers of the setting chemical test-crease, without charge, any quantity of wool cloth swatches that a mill may wish to submit.

As a further aid, the Bureau will recommend dyestuffs to be used in conjunction with the Si-Ro-Set chemical, ammonium thioglycolate, which is sprayed onto a garment just prior to final pressing and drying. It is pointed out that the chief responsibility placed on the manufacturer is that of delivering goods properly washed, neutralized, and colored with the correct dyestuff.

Inquiries should be directed to The Department of Science and Technology, The Wool Bureau, Inc., 360 Lexington Ave., New York 17, N. Y.

A way to measure yarn crimp in cotton fabric at the loom

■ A NEW, accurate way of measuring the crimp in cotton yarns in a fabric—a factor that greatly influences strength, flexibility, abrasion, and tear resistance of cotton fabrics—has been developed by U. S.D.A. scientists.

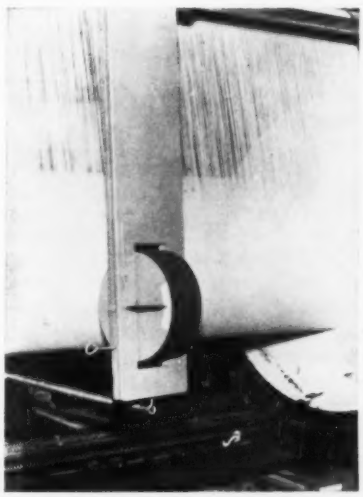
The method allows crimp to be measured during the weaving process without removing the fabric from the loom.

Emery C. Kingsbery and Norris P. Roddy of USDA's Agricultural Research Service found that by measuring the difference in the length of a yarn before and after it is woven into cloth, the percentage of crimp can be easily calculated. With this information available when the weaving is begun, simple adjustments can be made on the loom to produce the desired degree of crimp.

For best performance, crimp values must be chosen according to fabric construction. Duck cloths are woven with a high degree of crimp in the yarn while voiles and organdies are woven with a low degree of crimp. In essence, the new method involves measuring 18 inches of yarn before it is woven into the fabric, and its crimp length in the woven fabric.

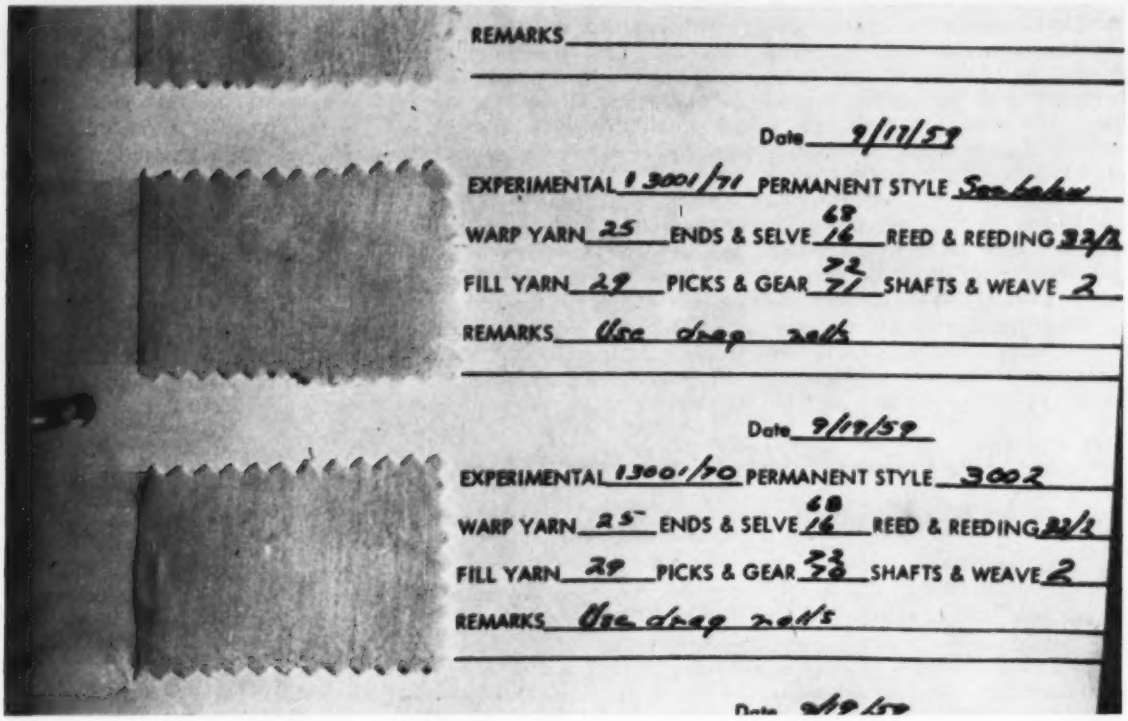
This is accomplished by inserting into the fabric on the loom, and across the warp yarn being woven into the fabric, a piece of yarn different in color from that being woven. A wheel-like device (see illustration), 18 inches in circumference, has been adapted to automatically indicate when 18 inches of warp yarn have been pulled from the beam and woven into the fabric. At this point another piece of colored yarn is inserted into the warp.

After this short length of cloth has been woven, the percentage of crimp can be determined by measuring the distance between the two inserted pieces of yarn and comparing that distance with 18 inches.



Measuring device consists mainly of shellacked hardwood wheel 18" in circumference, mounted on a plywood frame. Shellac gives traction when wheel turns with warp. Wheel is held firmly against warp by a three-pound weight suspended beneath the loom and fastened to the frame by a rope-and-spring connection to prevent bouncing due to the looms rocking motion.

Part of a page from the author's loose-leaf book of swatches. Transparent, pressure-sensitive tape is used to fasten the swatches to the paper. Forms for data are produced with a rubber stamp.


REMARKS
Date 9/17/59
EXPERIMENTAL 13001/71 PERMANENT STYLE Seaboard
WARP YARN 25 ENDS & SELVE 68/16 REED & REEDING 22/2
FILL YARN 29 PICKS & GEAR 72/71 SHAFTS & WEAVE 2
REMARKS Use drop rolls
Date 9/19/59
EXPERIMENTAL 13001/70 PERMANENT STYLE 3002
WARP YARN 25 ENDS & SELVE 68/16 REED & REEDING 22/2
FILL YARN 29 PICKS & GEAR 72/70 SHAFTS & WEAVE 2
REMARKS Use drop rolls

Is fabrics identification a problem in your mill? Try one of these

two ways to code fabrics

by Mara Havinoviski
Exclusive

WHEN a mill produces a great variety of fabrics, it usually becomes necessary not only to keep track of their differences but also to simplify their description for more efficient communication of specifications. This can be accomplished by coding.

Our experience has proved both name-type and number-type coding very successful in this connection. Of course, the coding type to use will depend on the types of fabrics being woven and on many other individual mill requirements.

Name Coding. This is the simpler one of the two types, and it will clearly indicate a distinction between individual fabrics and between groups of related fabrics. One mill, which manufactured drapes and bedspreads, distinguished its styles by geographical, historical, or girls' names.

For example, as was illustrated in a previous paper *(Weave Room Records Simplified with Standard Forms,* T.I. April 1956, p. 158) Nancy had 18/1 colored warp and 20/2 white filling, etc. . . Diane had 25/1 white warp and 22/2 colored filling, etc. Clara had the same construction as Nancy, and Adele had the same construction as Alice. Their difference was only in the Jacquard design.

A construction sheet for each style in a reference book identified each individual style when necessary. In communicating fabric specifications, the style name would be stated alone whenever possible.

However, in some cases it may have to be accompanied with a measure of necessary construction information to convey its distinction more definitely. There could be a further step in style designation if a line of dobbies were introduced.

This group of related fabrics could be distinguished from the Jacquards by getting geographical names. Thus, it will be clear to understand immediately that Ida is a Jacquard design while Boston is a dobby weave. The reader can use his own imagination and experience to fit name coding in such a way as to best meet his particular mill needs and market-

ing requirements.

Number Coding. This is also very successfully used in our mill which weaves a variety of dress goods, fancy linings, and upholstery fabrics. This type of coding carries more information than does name coding.

Thus, a better control can be kept of a larger variety of experimental fabrics as the number combinations is far vaster than the number of names available. In short, number coding is preferable where there is a greater variety of fabrics and where the availability of names could not possibly keep up with the number of fabrics that must be distinguished.

Let us now proceed with an illustration of our number coding system. Let S/3000 be the base for a six-shaft twill weave, 75 denier, bright acetate warp in 47/6 reed with 350/75/2z Chromspun lofted filling on 52 pickwheel. Style 4000 or S/4000 will indicate the same construction on a colored warp. Any alteration in the weave, filling and/or pickwheel would change the style designation or style number in units of 1. Thus a reverse twill effect will become S/3001. A further change to a 54 pickwheel and/or a 300 denier viscose filling will change the style designation to S/3002, etc.

Another construction change in either the reed number or in the number of harnesses would make the style designation progress in increments of 100, and could be identified respectively as S/3100, S/3200, etc.

Now suppose that we have another basic style: 100 denier dull acetate warp, in 34/4 reed, a six-shaft plain weave, and 42 picks of 21/2 tussah silk. Let this be S/1000, and on a colored warp it becomes S/2000.

If we were to introduce more ends in the warp and change the reed and reeding to a 200 sley construction, then the style designation should be altered in units of 1000, as it now becomes another basic style.

Since we already have a style 3000 and 4000, this new style will become S/5000. The general idea is thus to change style numbering in direct relation to the "difficulty" of change. Or, you may say that style numbering depends on the frequency of change, smaller increments for more frequent changes.

Essentially, the code numbers are changed in increments of 1 when a change is made in weave, filling type, count or pickwheel; in increments of 100 when reed, reeding, number of harnesses or draw are changed; and in increements of 1000 when the number of warp ends or the warp count is changed. The last category would constitute a change in basic style, of course.

To preserve the balance of this numbering system, we must make it devoid of exceptions. Otherwise, we will encumber and unduly complicate the system.

This balance can be reached by "saving" on numbers. The saving can be accomplished by stating all experimental styles by their closest basic style number and indicate this derivation with additional information.

For example, if S/3002 were again changed to say 200 denier or 150 denier filling, we can indicate the resulting styles as S/2002/200 or S/3002/150. A change to 58 pickwheel only could be identified as S/3002/58.

If after changing to S/3002/200 there is a further change to 58 pickwheel then we say that this is S/3002/200/58. These samples will get a permanent number when the customer has accepted them.

We keep a book of all swatches (see photo on opposite page), and give every swatch a style number upon its introduction in the book. All swatches have pertinent construction information. In view of the variety of colors, we use either manufacturers' color number or dyers' designation.

Making Army fabrics? Here's important data

■ A NEW list of the basic fabrics authorized for use in certified Army uniforms for male and female personnel was published on July 13, 1959, by the U. S. Army Uniform Quality Control Office (Bulletin No. 17). It was emphasized that subsequent to January 1, 1960, only the fabrics contained in the list may be used in certified uniforms.

Also of interest to textile manufacturers who make Army fabrics is the following information which was extracted from the bulletin:

Army Tan uniform. The uniform previously known as the Tropical Worsted uniform has been officially named the Army Tan uniform. This uniform is authorized in either the M-1 shade or Army shade No. 61. The change of name corrects a misnomer that has existed since blended fabrics, and fabrics of other than tropical weave, have been authorized for the uniform.

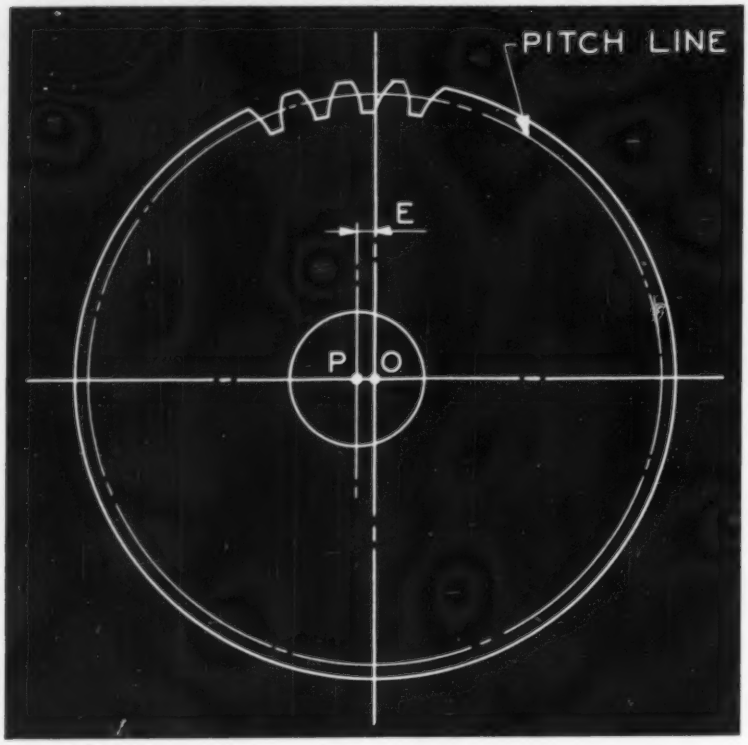
Use of Army shade No. 61 fabric for this uniform is likely to be continued only for the period required to attrite this shade from the Army supply system and from commercial outlets. Textile manufacturers are hereby notified that at a future date, not yet determined, certificates issued for Army shade No. 61 fabric may be revoked. Manufacturers are encouraged to convert all Army shade No. 61 production to shade M-1 as soon as possible.

New Dye Formulations for Taupe 179 Coated Fabric. A new dye formulation of improved characteristics was made available to dyers of cloth, nylon, polyvinyl butyral coated, taupe 179, approximately eight months ago. Suppliers are advised that materials tendered for certification should be in the new non-phototropic formulation or its equal. The U. S. Army Uniform Quality Control Office will no longer accept any taupe 179 coated fabric which shows a phototropic effect. Information concerning the new dye formulations may be obtained from the U. S. Army Uniform Quality Control Office.

The tolerance range for this fabric has been changed, and the extremely liberal tolerance which has been permissible heretofore will no longer be allowed.

Shade Evaluation of Fabric Samples. All textile firms are advised that a preproduction sample submitted to this Office for approval or comment in order to obtain guidance on the control of production does not, once approved, constitute a replacement for the sealed standard sample furnished by the U. S. Army Uniform Quality Control Office.

Figure 1. An eccentric gear—a gear with the hole off-center. O is center of pitch line; P is center of hole in gear; E is eccentricity. Run-out is twice amount hole is off-center



Do you check gear run-out too?

Its effects can often go a long way toward explaining troubles met in making high quality yarn and fabric

by Herman Granberry
Head, Mechanical Department
Research Division
West Point Manufacturing Co.

Exclusive

A GEAR has "run-out" when the pitch line of the teeth is not concentric with the bore. In other words, the teeth are "off-center" with the bore of the gear. The American Gear Manufacturer's Association defines gear run-out as follows:

"Run-out of a gear is the total difference between high and low readings of a dial indicator suitably arranged to denote the off-center relation of the axis of the tooth profiles with respect to the gear journals or the axis about which the gear rotates. It is twice the eccentricity. It includes the effect of side run-out or wobble."*

Figure 1 illustrates an eccentric gear which is best described as a gear with the hole off-center. The run-out is twice the distance the the hole is off-center.

What Causes Run-Out? Gear run-out may be the result of one or more causes. Probably the most frequent cause is the fact that the gear blanks are mounted on a bent or crooked arbor while they are being cut in the gear hobbing machine. Of course if the bore of the gear is a loose fit on the arbor, then we may also expect the gears to have run-out. Poor bearings or worn parts in the gear cutting machine are also likely to produce gears with run-out.

Good gear manufacturing practice demands that the bore of the gear be square with both faces of the gear, or with the faces of the hub. Gear run-out results when gears are made with the "sides" of the gear blank not parallel with each other or when the bore is not at right angles to both of these sides, if the gears are stacked on the arbor of the gear cutting machine in order to cut two or more gears at the same time.

If the "sides" of the gear blanks are not parallel with each other and if they are not also at right angles to the center line of the bore, then when the gears are stacked and clamped against each other, the arbor will be "bent" because of the out-of-square faces of the gear blanks.

Even with the best machines and with the best of gear manufacturing practices, some gear run-out will occur. The problem is to keep it within reasonable and acceptable limits for the application for which the gear is intended. It goes without saying that the closer the gear run-out tolerances, the more the gear will cost to manufacture. The gear user and the gear manufacturer should have an agreement or "standard" as to what tolerances are needed and what extra cost if any is to be added to the regular price for holding these tolerances.

The leading gear manufacturers have an organization known as the American Gear Manufacturer's Association, and they have developed and published standards

*AGMA Standard No. 231.02-7-56

for use in gear inspection. The AGMA Standard No. 231.02 of July, 1956, covers the inspection of coarse-pitch (½ P to 20P) spur and helical gears and Standard No. 236.03 covers the inspection of fine-pitch gears. Most gears used on textile machinery fall into the coarse-pitch classification.

The AGMA has divided coarse-pitch gears into classes according to the speed at which the pitch line is intended to operate as follows:

Class 1 ..... up to 80 fpm
Class 2 ..... up to 400 fpm
Class 3 ..... up to 2000 fpm
Class 4 ..... over 2000 fpm

These classes are purely arbitrary and in some cases it may be necessary, for any one of several reasons, to use gears of class two or three accuracy at lower speeds. In choosing the class of accuracy required, much will depend upon the economics of a given gear problem.

The AGMA standard for run-out for each given gear class depends upon the gear diameter and is listed in *Table 1*. The maximum run-out for each class is listed according to diametral pitch and pitch diameter of the gear.

The run-out tolerance for fine-pitch gears is handled a little differently by the AGMA, and this standard is listed in *Table 2*.

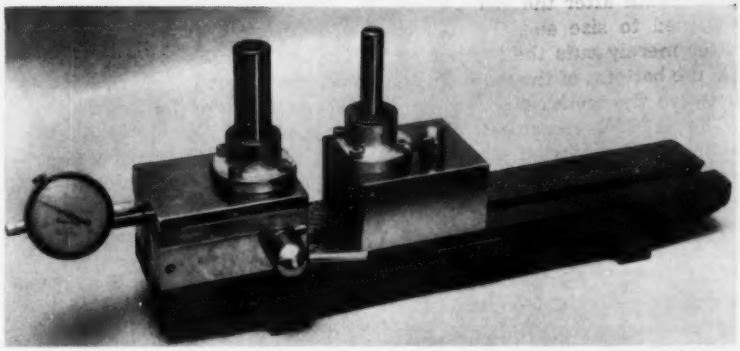


Figure 2. Gear run-out tester developed by West Point Manufacturing Co. Stud on right is fixed stud; one on left is spring loaded. Dial indicator gives variations in gear run-out.

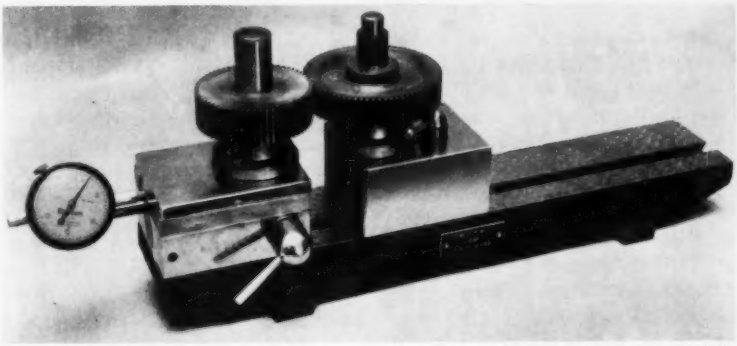


Figure 3. Gear run-out tester, with gear to be tested on right and master gear on left. The gears are slowly rotated by hand in order to check all points on their circumference.

How Is Gear Run-Out Measured? Some mechanics feel that gear run-out can be measured by mounting the gear on an arbor and checking the run-out of the *tops* of the teeth while it is rotated on centers. This is not a check for run-out unless the gear has been cut with a topping cutter. A topping cutter cuts the outside diameter of the gear at the same time it cuts the pitch diameter and the tooth form.

Gears are *not* usually made in this manner. The outside diameter of the gear (which becomes the top

TABLE 1. Run-Out Tolerances (Inch) for Spur and Helical Gears

Class	Dia Pitch	Pitch Diameter of Gear, Inch					
		¾	1½	3	6	12	25
Class	4	.....	.....	0.005	0.006	0.006	0.008
1	8	.....	0.003	0.005	0.006	0.006	0.008
(to 80 fpm)	16	0.003	0.003	0.005	0.006	0.006	0.008
Class	4	.....	.....	0.002	0.002	0.002	0.0025
2	8	.....	0.0015	0.0015	0.002	0.002	0.0025
(to 400 fpm)	16	0.0015	0.0015	0.0015	0.002	0.002	0.0025
Class	4	.....	.....	0.001	0.002	0.002	0.0025
3	8	.....	0.001	0.001	0.0015	0.002	0.0025
(to 2000 fpm)	16	0.001	0.001	0.001	0.0015	0.002	0.0025
Class	4	.....	.....	.....	0.001	0.001	0.0012
4	8	.....	.....	0.001	0.001	0.001	0.0012
(over 2000 fpm)	16	.....	0.001	0.001	0.001	0.001	0.0012

Source: AGMA Standard No. 231.02, July 1956

TABLE 2. Commercial Run-Out Tolerances for Fine-Pitch Gears (20-Pitch and Above)

Class	TCE[1]	TTCE[2]
	Inch	Inch
I	0.006	0.002
II	0.004	0.0015
III	0.002	0.001
IV	0.0015	0.0007

[1]Total composite error, including run-out, pitch error, tooth thickness variation, profile error, and lateral run-out or wobble.

[2]Tooth-to-tooth composite error.

of the teeth after the gear is cut) is turned to size and the hob or cutter merely cuts the tooth form and the bottoms of the tooth spaces (between the teeth).

The AGMA recognizes several methods of measuring pitch diameter and run-out. One of the most common ways, and perhaps the easiest way, of measuring gear run-out is to roll the gear in mesh under a light pressure with a "master gear" that has practically no run-out.

When the gear is rolled in mesh with a master gear the center distance (the distance between the centers of the two gears) will vary if there is any run-out present in the gear being checked. It should also be noted that any variation in tooth form, thickness, or spacing will also affect the center distance. These latter errors are usually relatively small, however, and the reading of the variation in center distance is called the run-out, the TIR (total indicator reading) or the TCE (total composite error).

A gear tester for checking gear run-out by this method is usually called a "gear rolling fixture," and is so designed that one stud is fixed and carries the master gear. The second stud is mounted so it can move (under spring pressure) in or out toward the fixed stud. A dial indicator gives the thousandths of an inch that the gear moves.

The difference between the high reading and the low reading on the dial indicator, when the gear being tested is rotated in mesh with the master, is called the TCE (total composite error) and is generally referred to as run-out. It is actually the sum of tooth-to-tooth composite error and run-out.

This tooth-to-tooth composite error is sometimes called tooth-to-tooth "flicker" and as a rule it is relatively small in comparison with the run-out. If it is rather high it may indicate a poor tooth form or poor tooth spacing.

Gear rolling fixtures are not new. They give a relatively simple method for checking gears. New and expensive machines are available which check gear tooth profiles, gear run-out, and gear involutes and draw a graph or chart of all errors. These checkers are used on higher precision gears.

The gears used in the textile industry have, in many cases, been little more than "cogs." In early machinery, many of them were cast tooth gears, and even today many are very crudely cut. In a great number of low speed, low-load applications these crude gears are quite satisfactory and more accurate gears would not be economically practical.

In more modern high-speed, high-draft textile machinery, and particularly in draft trains of roving and spinning frames, the need for more accurate gears is becoming more apparent.

The textile gear user can perhaps best check the gears that he makes, or purchases, for run-out by using the well-known and old-fashioned gear rolling fixture. These fixtures are available from several manufacturers (usually at prices of from $500 to $1000), but the West Point Manufacturing Company has developed a simple model (*Figures 2* and *3*) which is available from Custom Scientific Instruments, Inc., Kearny, N. J.

After a mill acquires a fixture it should purchase master gears. A master gear is simply a very accurate gear. The best wear is obtained from master gears that are hardened and ground. The total composite error of the master gear should be less than 0.0005″. This error of the master gear must of course be allowed for in making readings of gear run-out.

A master gear is required for each pitch and for each pressure angle of gear that is to be checked. Also, if helical gears are to be checked, a different master is also required for each hand of spiral. Master gears are not easily made and are quite expensive. The price is usually from $50 each to $200 or more each depending on the accuracy required. In most textile applications an accuracy of 0.0005″ TCE is satisfactory, and a master gear about 3″ in pitch diameter can be obtained for approximately $50 to $60.

Care must be exercised in using the gear rolling fixture if good results are to be obtained. The fixture and the master gears should be treated as the expensive precision machinery they are. They should be kept clean and free from rust. A nick or burr on the master gear will give the same effect as a burr on the gear being checked and may be mistaken for run-out.

Whenever gears are to be checked they should first be cleaned. This is best done with a soft wire brush mounted on an electric motor. The brush should have 0.0015″ or so diameter wire so as not to damage the gear. Any burrs or nicks should be removed from the gear bore and the teeth.

In many cases the gear is mounted on a bushing in order to adopt the bore of the gear to the stud on the gear checker. The bushing should be so made with a slot or key that it will not rotate with the gear. If the adaptor bushing turns, then you will also be measuring the bushing run-out.

Most gear checkers have a key or pin to keep the adaptor bushings from turning. The gears must turn freely on the studs and the gear teeth must be clean if an accurate check of the gear run-out is to be made.

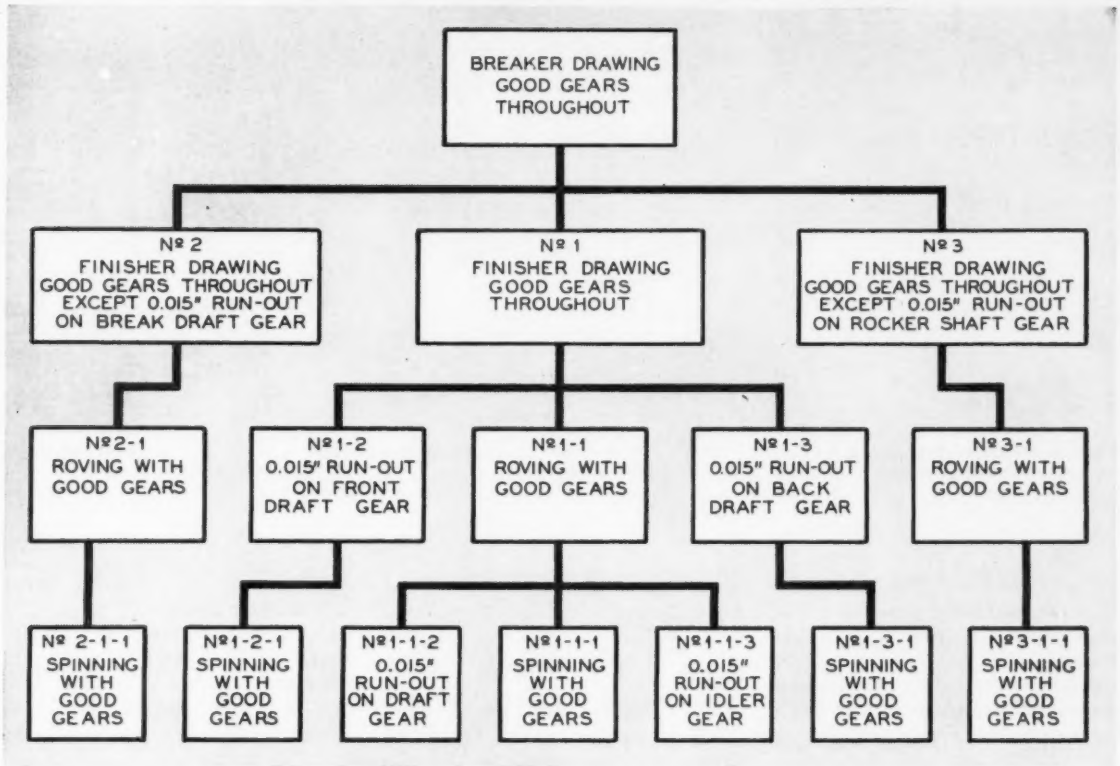
What Is The Effect of Gear Run-Out? Gear run-out destroys, to a certain degree, the proper action of a gear. Under certain conditions the gears actually interfere with each other and mesh too lightly during one part of the revolution. Proper tooth action is destroyed because run-out causes a "sliding" action of one tooth face against the other rather than the desired "rolling" action. These factors cause a shortening of the useful life of the gear.

Another result of gear-run-out, and perhaps the most important from the standpoint of textile drafting processes, is the varying angular velocity that results from gear run-out. If a gear runs out it will not rotate smoothly and at the same rotational speed for all of each revolution. Part of each revolution will be a little faster than the rest of it. This is quite important in drafting of textile fibers, because it is highly undesirable to introduce variations in drafting which result in variations in the evenness of the stock which is being drafted.

The effects of gear run-out then may be summed up as follows:

1. Possible interference or forcing of gears on center distance.
2. Improper gear tooth action,

Figure 4. Flow chart for gear run-out tests. All gears referred to as "good" have 0.003" or less run-out.


BREAKER DRAWING GOOD GEARS THROUGHOUT
Nº 2 FINISHER DRAWING GOOD GEARS THROUGHOUT EXCEPT 0.015" RUN-OUT ON BREAK DRAFT GEAR
Nº 1 FINISHER DRAWING GOOD GEARS THROUGHOUT
Nº 3 FINISHER DRAWING GOOD GEARS THROUGHOUT EXCEPT 0.015" RUN-OUT ON ROCKER SHAFT GEAR
Nº2-1 ROVING WITH GOOD GEARS
Nº1-2 0.015" RUN-OUT ON FRONT DRAFT GEAR
Nº1-1 ROVING WITH GOOD GEARS
Nº1-3 0.015" RUN-OUT ON BACK DRAFT GEAR
Nº3-1 ROVING WITH GOOD GEARS
Nº 2-1-1 SPINNING WITH GOOD GEARS
Nº1-2-1 SPINNING WITH GOOD GEARS
Nº1-1-2 0.015" RUN-OUT ON DRAFT GEAR
Nº1-1-1 SPINNING WITH GOOD GEARS
Nº1-1-3 0.015" RUN-OUT ON IDLER GEAR
Nº1-3-1 SPINNING WITH GOOD GEARS
Nº3-1-1 SPINNING WITH GOOD GEARS

resulting in excessive wear.

3. Varying angular velocity, which introduces variation into textile drafting processes.

The net effect of gear run-out on the textile stock is probably the most important effect of gear run-out, although the factor of reduced gear life and thus increased gear cost should not be overlooked.

In earlier days in textile processing, when drafts and speeds were low, the run-out of gears was not nearly so critical as it is now in the days of high speeds, high drafts, high labor costs, and high quality requirements.

How Much Run-Out Is Too Much? In view of the fact that *all gears have some run-out*—none is perfect—the question arises as to what is the practical limit of gear run-out which a mill can economically tolerate?

From a theoretical standpoint, it could be argued that every different gear might be able to have a little different run-out from the others and that different stocks, different drafts, different machines, different hank sizes, and different mixes would theoretically require a different gear run-out limit. While all of this may be true, it is a practical matter that a *few* simple standards for gear run-out are better than none and these standards should be very carefully set and very carefully tightened or added to as justification for such changes is found. A lot of money can be wasted if tolerances are unnecessarily tight.

There are, in general, two factors to consider in setting up standards for gear run-out:

1. What is the commercial standard for gear run-out on the gears I am buying now? What premium will I have to pay for less run-out?
2. What maximum run-out can I tolerate? What effect does reduced run-out have on the quality of my stock?

The first question can usually be answered by your gear supplier. The second one is your question and the answer is not easy.

One approach to the second question is to make tests in the mill or laboratory. One such a group of tests was made and the results are shown here. It must be remembered that such test results will probably vary from one mill to another. The testing procedure is rather expensive but a certain amount of testing may be desirable if best results are to be obtained. Of course it is always possible to obtain fair results by following "the industry" and doing as "other mills" are doing.

Effect of Run-Out on Evenness. Since it was expected that gear run-out would introduce unevenness into the sliver, roving or yarn; it was logical to look to unevenness tests for measurements of damage due to excessive gear run-out.

Unevenness, or variation in weight, can be measured in a number of ways but the Uster Spectrograph was chosen because the unevenness was expected to be of a cyclic nature and in some cases it would be a short term variation while in others it would be a long-term variation.

In order to determine the effect of gear run-out on quality, samples of drawing sliver, roving, and yarn were processed under con-

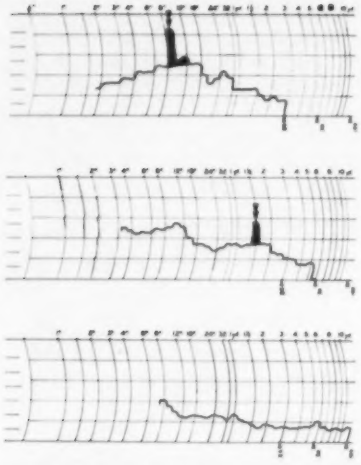


Figure 5. Effects of gear run-out on drawing and subsequent processes.

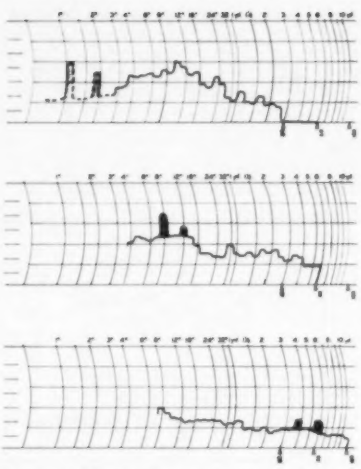


Figure 6. Effects of gear run-out on drawing and subsequent processes.

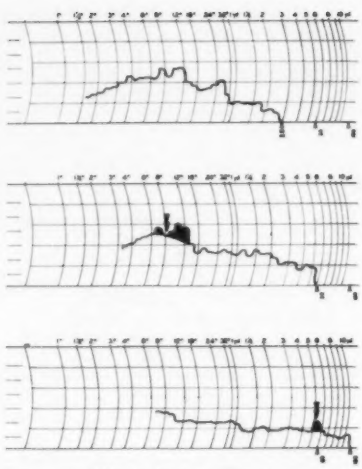


Figure 7. Effects of gear run-out on roving and subsequent processes.

trolled conditions. The test procedure and sampling procedure used are shown in the flow chart, *Figure 4*.

Selected 57-grain 1″ cotton card sliver was processed into 57-grain breaker drawing sliver. This portion of the test was done on a frame that was in new condition and with gears in the draft train having less than 0.003″ runout. On this and subsequent drawing tests, the stock was all run through the same delivery.

As the next step the drawing frame was set up as a finisher frame to deliver 55-grain finisher drawing sliver. When good gears were used the sample was marked as sample No. 1.

As the next step a 40T foot-end break draft change gear was replaced with one having 0.015″ runout; all other gearing remained the same. Samples of finisher drawing run in this manner were marked as Sample No. 2. Another sample of finisher drawing was run with good gears at all points except that the 40T rocker shaft gear was replaced with one having 0.015″ run-out and sample No. 3 was produced.

This gave three samples of 55-grain drawing sliver as shown on the second level (from the top) of *Figure 4*.

Samples No. 2 and No. 3 were then processed into 1-hank roving on a roving frame with good gears throughout, and spun into 20s yarn on a spinning frame with good gears throughout. This gave samples No. 2-1, No. 2-1-1, No. 3-1, and No. 3-1-1, as shown on the flow chart.

The finisher drawing sample No. 1 was processed on the roving frame with good gears (sample No 1-1) and then sample No. 1-2 was made after replacing the good front draft gear with one with 0.015″ run-out. Sample No. 1-3 was made after adding a back draft gear with 0.015″ run-out.

The three samples of 1-hank roving (No. 1-1, No. 1-2, and No. 1-3) all made from same good breaker drawing were spun into yarn. Notice from the flow chart that samples No. 1-2 and No. 1-3 were spun with good spinning gears, and that sample No. 1-1 was spun with good spinning gears. Sample No. 1-1-1 with 0.015″ run-out added to the draft gear gave sample No. 1-1-2, and 0.015″ run-out was added to the intermediate idler gear between the second and back roll gears to give sample No. 1-1-3.

The results gave:

3 samples of finisher drawing
5 samples of roving
7 samples of yarn

It will be noted from the flow diagram that the processing was so arranged that no samples contained the results of more than one intentional defect, thus all cycles that showed up during the physical tests were directly traceable to their sources.

Conventional tests for variations, evenness, and strength did not yield significant results. This was probably due to the small size of the sample tested and to the fact that the nature of some of the conventional tests tend to average out the variations that were introduced by gears with run-out. The Spectrograph results were quite informative.

Spectograph charts on *Figure 5* show the effect of 0.015″ run-out of break draft gear on finisher drawing, on the roving from this drawing, and on the yarn.

It is possible to calculate the periodicity of the unevenness introduced by an eccentric gear since it introduces one cycle per revolution of the gear and this can be related to inches of stock delivered.

The arrows on the charts show the *calculated periodicity* of the unevenness and the blacked-in humps show the location and the approximate frequency of the periodicity which was actually introduced. In sample No. 2 the calculated periodicity was 8.2″ and the actual was about the same. In the roving (sample No. 2-1) this periodicity was drafted into one of 1½ yards (as was calculated). The calculated location of this periodicity in the yarn was at 30 yards and this does not show on the chart for sample No. 2-1-1 because it was off the chart.

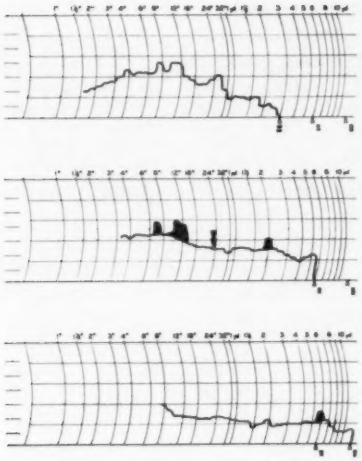


Figure 8. Effects of gear run-out on roving and subsequent processes.

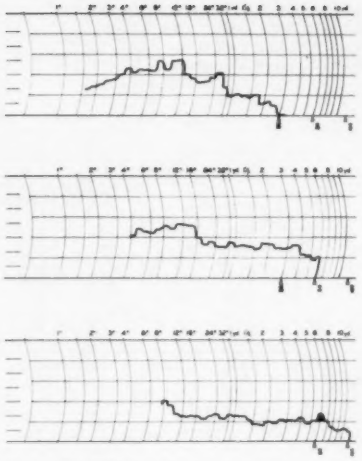


Figure 9. Effects of gear run-out on the spinning process.

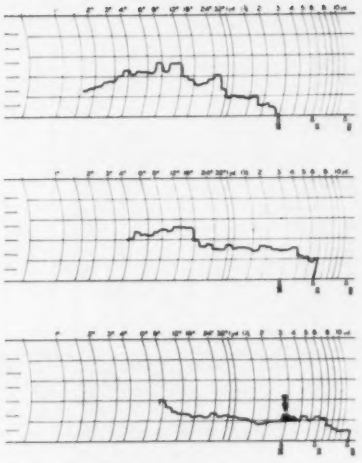


Figure 10. Effects of gear run-out on the spinning process.

Figure 11 shows the control sliver, roving, and yarn for comparison purposes.

Figure 6 shows the effect of the out-of-round knock-off gear. This is interesting because this gear is not in the draft train. It is apparent, however, that it introduced vibration or a cycle into the draft train and affected the variation. Notice the double "blip" in sample No. 3-1 and that it carried into the yarn in No. 3-1-1. The periodicity in No. 3-1 was figured "backwards" to see where it would have been in sample No. 3 and it was located where the dotted blips show. This was not on the Spectrograph because it was off the chart. The location of the two blips on the sample No. 3-1-1 were about as expected from those in sample No. 3-1.

Figure 7 shows good drawing processed into roving sample No. 1-2 and how this gear-run-out affects the roving and then the yarn. Notice that the actual and the calculated periodicities agree pretty closely.

Figure 8 shows good drawing processed into roving sample No. 1-3 and how this particular gear run-out affected the roving and yarn. Notice that here the calculated periodicity in sample No. 1-3 is 23½" and that there is a blip at 2 yards and also at 7" and at 11" - 12". This is probably due to a harmonic or secondary effect.

Figures 9 and *10* show the effect of gear run-out on spinning. *Figure 11* shows the charts of all "good" or control samples.

These Spectrograph charts indicate the following:

1. Gear run-out does affect the evenness of the stock. (This is particularly true if gears are well meshed; if they are loosely meshed the resulting effects of run-out are less).

2. The effect can usually be predicted as to periodicity and it carries on from drawing into roving and yarn.

3. Unexpected results may also be encountered. Vibrations or drafting waves may set up conditions resulting in harmonic or secondary disturbances (as when the knock-off gear introduced variation into the drafting zone).

4. In this case at least, a gear run-out of 0.015" seems to be too much for good quality work.

5. It also seems that (in this case at least) 0.003" does not seem to introduce periodicities *above the general level of the process.*

How Can We Start a Gear Inspection Program? When the mill becomes convinced that gear run-out is important, its next question is usually "How can we start?" and "How far should we go?" There are a great number of answers to these questions and to a great extent the answers must be worked out by each individual mill. There are several logical approaches and one or two are given here in order to assist anyone who would like to start a gear program.

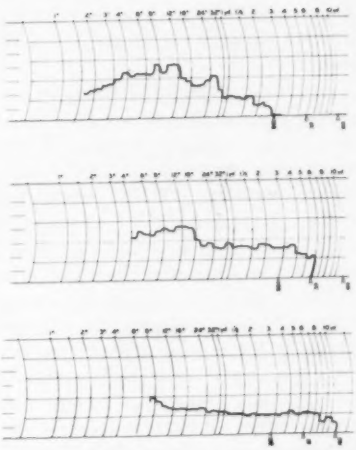


Figure 11. Control stock—drawing, roving, and spinning.

It seems logical to start with the gears that are most important from a quality-of-product standpoint (such as gears in the draft train of drawing, roving, and spinning frames) and to add other gears as they can be justified. Generally there are three broad classes of gears to control:

1. All new gears, whether purchased or made in the mill shop.

2. All gears in the supply room.

3. All gears in production (on the frame or in the change room or the departmental stock).

Any standards should be set

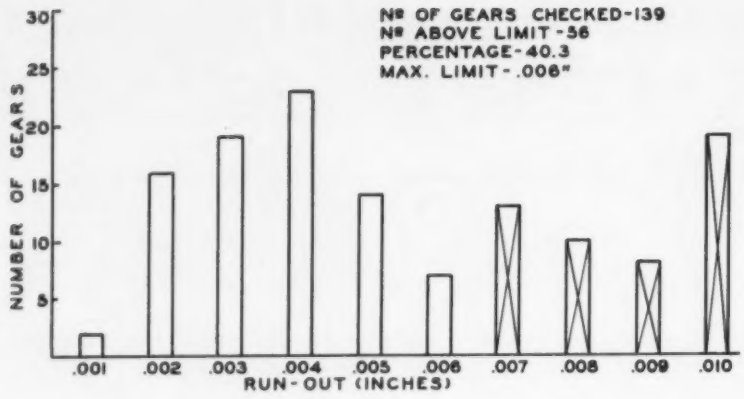


Figure 12. Amount of run-out found in the 20 DP spinning draft gears in one mill.

only after consulting with the machinery or gear manufacturers. In most cases the manufacturer can and will supply Class 1 AGMA gears at no additional cost and if drafts are not too high, it may be well to start with Class 1 tolerances.

All requisitions and purchase orders for new gears would have a note that "Gear run-out (TCE) must not exceed 0.XXX"," or "Gear run-out (TCE) must be within Glass 1 AGMA tolerances."

The best way to check gears received from the manufacturer (or the mill shop) is to buy the gear rolling fixture and suitable master gears. It is usually a good idea to give the receiving inspector orders to pass any gear that reads not more than 0.0005" above the AGMA Class 1 limit. This 0.0005" gaging allowance is to take care of any run-out in the master and any small errors in reading the dial indicator.

It may be necessary to give 100% inspection at the start; later it may be possible only to spot check the gears to be sure that the lot is satisfactory. The quality control department will be able to give some good advice in this respect.

The above procedure will usually take care of all new gears, but the bigger problem usually lies in the gears already on hand in the supply room and in other places in the mill. One group of mills checked and found that they had about a million dollars worth of change gears on hand! No one would care to replace too many of these at one time.

It is recommended that a goodly sample of the gears on hand be checked and then a decision can be made. In one mill a total of 139 spinning draft gears were checked and the results were listed. *Figure 12* shows the number of gears having different amounts of run-out.

From this chart it is a pretty easy job (easier at least) for management to decide what limits could be applied to the gears on hand without too much expense. In this case it was apparent that the "normal" distribution would have an average run-out of 0.004" and that 0.006" or 0.007" would be a good cut-off point (if quality requirements would not suffer too much). In this case it was decided that all gears on hand with run-outs of 0.007" or more would be scrapped and replaced with good gears.

This program of checking and ordering replacements is a slow job but should be handled systematically in order to include all gears. First, it is wise to check all gears in the supply room; next the individual change rooms and fixers' stocks of gears are checked. At the same time the overhauling crew is given orders to check all gears for run-out on the frames as they are overhauled.

In the course of time the overhauling will include all frames and the gears will be in good shape. It is important of course to be sure that any draft gears that are changed on the frame before overhauling are checked before they are put into the "stock" rack.

The above program does not reduce all gear run-out to the Class 1 limit but may make the job of cutting off the dog's tail a little more painless by cutting it off a little at a time. Later a maximum run-out of perhaps 0.004" can be set and the remaining gears can be brought to standard run-out.

Most mills that start such a program soon find that the gears their own shop produces may be quite poor in respect to AGMA Class 1 run-out tolerances. This results in better gears from their shop or a decision to buy gears rather than make them (except in cases of emergencies).

If such a gear inspection program is started and is well carried out, it will be most revealing. It will soon become apparent that:

1. The bore is also important. It should be of the right size and finish.

2. The studs or shafts on which gears are used must be in good condition if a gear is to run properly.

3. Gears are expensive items and greatly affect quality of roving, yarn, and cloth. It is, in many cases, good business to buy gears of better material and hardened gears.

The problem of gear run-out is just another of the mechanical problems which are becoming more critical as the cost of labor increases, and as competition becomes greater. The textile machinery manufacturer and the gear manufacturer, as a rule, are not unhappy to sell gears to AGMA Class 1 tolerances. It gives their customers a chance to find out what they have been telling them for years:

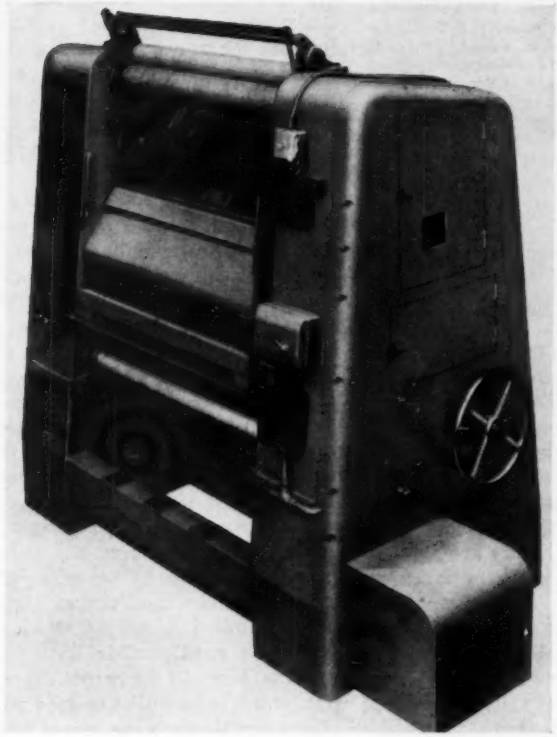
1. "We produce quality parts."

2. "It is not wise to buy your parts from any fly-by-night shop."

3. "Our gears cost a little more than some people's but they are *better*."

The effects of gear run-out can also go a long way (in some cases) toward explaining some of the problems and troubles encountered in certain mills when they try to make a high quality yarn or cloth.

Readers will also be interested in the article "Some Causes and Effects of Roll Run-Out," by Mr. Granberry, which appeared in TEXTILE INDUSTRIES for January, 1959, pages 59-63.—The Editors



New way to make carpets

British method is intermediate between tufting and Axminster

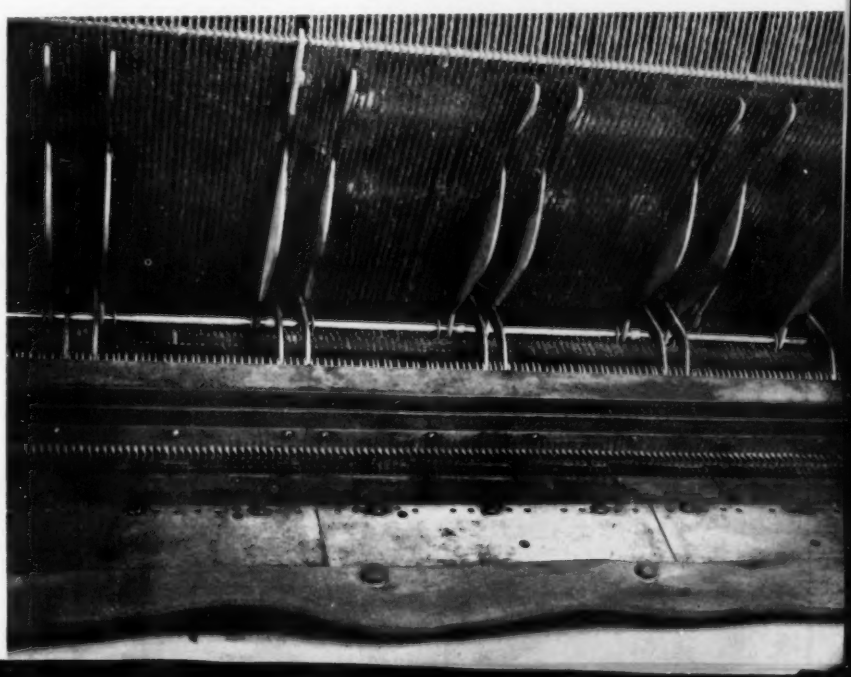
by P. Abbenheim
Exclusive

SINCE the introduction of tufted carpets to Britain a few years ago, carpet manufacturers and machine builders have been intensively looking into all manner of ways of making carpets more rapidly and more cheaply than by traditional methods.

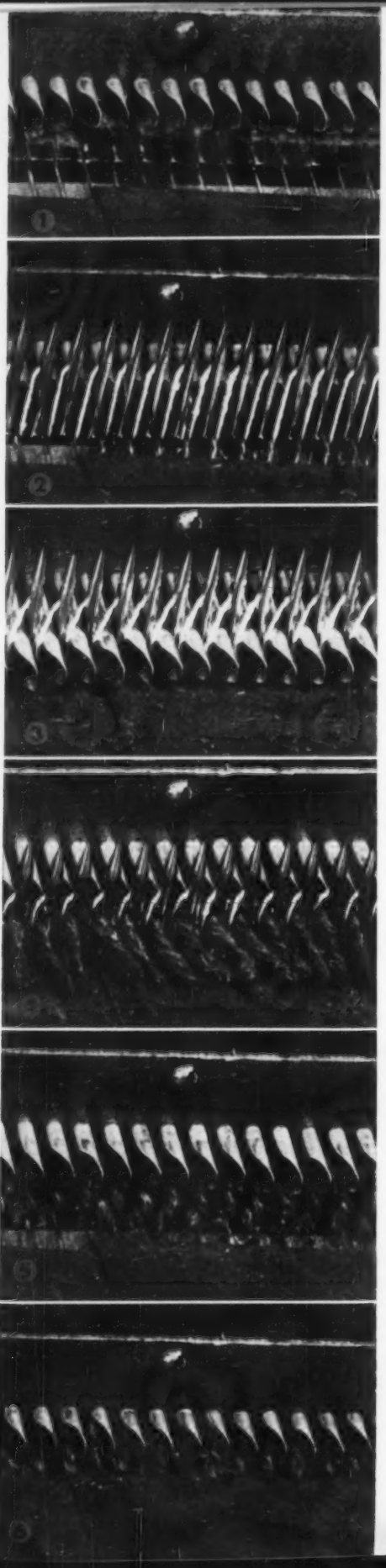
Traditional machinery, they felt, was far too slow, while tufting was, to some extent, too fast. It became evident that with the huge discrepancy between the old and new methods of carpet manufacture there was room for intermediate equipment that would make simple carpeting at a high speed and which would operate efficiently on a wide range of raw materials.

One firm that tackled the problem very seriously was David Crabtree & Son Ltd., of Bradford, England. This firm has been in production of traditional looms since 1853 and is well established in Britain, as well as overseas, in the gripper Axminster and spool Axminster carpet trades.

Under the guidance of W. Felton, a director of the company, work was initiated on a new type of carpet making machine which was introduced to the British carpet industry earlier this year. This machine makes a plain carpet at a rate well above traditional looms, but below the speed of a tufting machine. It might appear from this that the machine has little to offer that can not be obtained by a tuft-



General view of needle zone on the new carpet machine. Sheet of face yarn can be seen at top. Rew of yarn inserters is positioned above the knife plate, while pile cutting knives can be seen staggered across the base.



Tuft formation sequence on the new machine. 1. Chamfered inserter tubes above the knife plate, with knives below. 2. Needles with cotton warp yarns in raised position. 3. Inserters passing between cotton warp and needles. 4. Wool, after delivery, is gripped by cotton warp as needles descend and inserters recede. 5. Face yarn passes through knife bed to the carpet. 6. Knives advance and cut off measured length of pile.

er, but it will be realized that with this method of manufacture much less pile yarn is required than for tufting.

Already one of these machines, producing a 36-in. wide carpet is running in the plant of Tomkinsons Ltd., in the carpet center of Kiderminster. This machine has proved to be highly efficient and the firm is now planning further expansion into this new realm of carpet making. Crabtrees already are starting work on a 4-yd wide machine, while plans are well advanced to build a 5-yd unit.

As with tufting, this new machine uses a prewoven jute backing, but unlike a tufting machine, the tufts of pile yarn need not be locked into position with a latex backing. This is another feature in favor of the new machine.

The first installed machine is producing carpet at a rate of 120 rows of tufts per minute at Tomkinsons, but Mr. Felton states that this is probably a conservative rate of production which might well be increased on later machines when they have benefited from longer mill experience.

Construction. The carpet consists of three main elements: prewoven jute backing, pile yarn—Crabtrees favor wool—and a cotton warp used for binding in the tufts of pile. It is this cotton warp that provides a firm lock for the pile and eliminates the need for a latex backing.

On the machine at present in production there are five cotton warp threads per inch across the width of the carpet, but as each end draws in a twin tuft of pile yarn there are actually ten single tufts per inch across the fabric. This will be more apparent when the method of manufacture has been fully described. The result of this method of carpet-making is a carpet with a rich, dense pile that is in every way a quality product.

Method. The actual manufacturing technique as conceived by Crabtrees is extremely simple. Beneath the prewoven jute backing is positioned a row of needles, each threaded with an end of cotton warp yarn. When the cycle of tuft insertion begins, these needles pass upwards and through the jute to the face of the carpet. In moving in this direction they then pass through a knife plate situated at pile height above the carpet face.

When positioned in this "up" stage, insertor tubes advance to separate the cotton warp from the needle. These obliquely chamfered tubes easily part the two elements, and when the cotton is positioned around them another element, this time inside the tubes, advances and presents a length of face wool.

The two elements then begin to withdraw. In so doing the facing wool is trapped between the needles and the cotton warp threads.

As the needles slide back to a position beneath the carpet the cotton warp ends pull the face yarn down and through the carpet backing, and in so doing position a twin tuft in the backing, while simultaneously locking it in position.

As can be seen from this, on a tufting machine an end of face yarn passes from tuft-to-tuft, but on the Crabtree machine this link is provided by the cotton yarn. It is stressed by the inventors that quite a poor quality singles yarn of cotton, or some other material, say rayon staple, can be used for this purpose quite satisfactorily.

The double tube used for delivery of the face wool is very simple. The outer one is oval in section and, as mentioned above, chamfered so that it can very easily part the warp yarn and the needle.

The tube that holds the wool face yarn is quite different. This is designed so that the end of the tube closes fairly tightly against the yarn. This permits yarn to be drawn from it, but prevents it from slipping back. A positive grip of this nature thus protects the evenness of pile height, as the amount delivered at each stage of production can be controlled to fine limits.

By slitting the sides of the no-return tube, it is possible to make the two sides of it spring together

and grip the yarn firmly but quite lightly, and any tendency for the yarn to slip back is completely countered. A feature of this type of production is that yarns with reasonable weaver's knots in them can be used on the machine without there being any danger of breakages.

After the yarn has been drawn down through the knife plate and positioned in the jute backing, a bank of knives slide forward and cuts through each end of wool. These knives each cut 15 ends of yarn and are tapered so that a positive cutting, rather than a chopping, action takes place. Unevenness in the final carpet can be eliminated by a light brushing and shearing.

The yarn on the Crabtree machine is delivered to the unit from a creel, but this does not use the tube system commonly associated with tufting. Another big feature of the whole system is that the cotton warp on a beam, the jute backing, and the face yarn are all delivered to the same side of the machine as the carpet is delivered. This arrangement has obvious advantages, particularly as the operative, who is mainly concerned with watching the producing elements, is positioned on the other side of the machine where he has a clear and uninterrupted view of the carpet making.

The carpet is finally wound up on a conventional type of carpet rolling-up unit. The carpets now being made in Britain are made from a 16 oz/sq yd jute backing with a face yarn of 2/50s wool Axminster yarn. There are 12 rows of tufts per inch, but Crabtrees claim that it is quite possible to increase this up to 16 tufts per inch.

Rear view of new 36-inch carpet loom. Note leasing arrangement for cotton warp and the large-capacity take-up roller to the left.

Pile Yarns Used. They have pointed out that virtually any type of pile yarn can be used, even a very hard twist curly wool. The selling arrangements for the loom are such now that Crabtrees hope to be able to exercise some control over the type of carpets made on their machine and in so doing maintain a good quality level.

Pile height can be very easily varied from as low as ¼ inch to a maximum of ¾ inch, and the carpet made on the machine can be given exactly the same after-treatment as a conventional spool Axminster. It can be sized, steamed, and sheared, while the cost of latexing, essential in tufted carpet manufacture, is eliminated completely. They do recommend, though, that when cutting the carpet for laying, it is best to apply a film of latex along the raw edge to protect the tufts.

One factor that has not, apparently, been completely solved is stitch dropping. In the event of an end of yarn breaking, the only way of filling in the gap at present available is the tufter's repair gun. This, it would seem is not the ideal answer. It is, however, a feature of the new loom that breakages are very exceptional and it is not visualized that carpet manufacturers using it will be faced with the need for much repair work.

Marketing the Loom. The method of marketing the new loom, is to say the least, novel. Crabtrees, Mr. Felton has pointed out, feel that they want not only to recoup their heavy development expenditure, but also they feel that they should try, as far as possible, to protect the carpet-making technique from possible debasement and a struggle for the cheap end of the trade. This, they feel, has had an adverse effect on tufted carpet acceptance in Britain and they do not wish to see it repeated with this new process. They have, therefore, applied for patents on the system in all the major producing countries.

They feel that manufacturers

would be unwilling to purchase machines if these carried with them even a reasonable proportion of the development costs as the potential market, as at present conceived, is limited. They have decided, therefore, to supply the machines to customers who will buy them at a moderate price, but these manufacturers will be licensed to make carpet by the process and a levy of so much per yard of carpet produced on the machine. This royalty, they feel, will serve to cover the initial expenditure of development, while the license will also help them to keep an eye on carpet qualities being produced on their machines.

A firm with a long tradition of carpet loom building that extends back over a century, it is understandable that they should feel very strongly about the traditional benefits of wool as the ideal fiber for face yarn, but Mr. Felton claims that they are far from being hidebound in this view and that the possibility of including percentages of, say, nylon to improve wear, is not ruled out. In fact, almost any yarn that offers an improvement in quality or wear performance would be acceptable.

He has pointed out that in trying to exert some form of quality control over the process it is not his firm's intention to restrict manufacturing possibilities, but rather to safeguard against debasement.

Already British manufacturers are extremely interested in the machine and Continental European carpet makers are showing that they too would not like to be left out of any race that may develop.

Pro and Con. To sum up the features of the new process, we can say that the disadvantages of the technique, compared with tufting are twofold: 1) It is slower than tufting (but faster than conventional weaving); 2) It requires two sets of yarns for joining the pile to the jute backing.

Advantages of the system are: 1) A very highly efficient production rate; 2) Reduction in the weight of face yarn used to give the same degree of cover per unit area of carpet, compared with tufting; 3) Elimination of the latex backing which is essential in tufting.

In comparison with tufting and conventional carpet manufacture, it is reasonable to say that the Crabtree process looks as though it may well provide an intermediate method of manufacture that will fill the space between tufting and Axminster carpet processes.

At present there is a limitation on the machine which only allows it to make plain, striped, or mottled carpets and it is obvious from the method of manufacture that it will be as difficult to introduce patterning on this machine as it is on a cut-pile tufting machine.

Nonwovens are coming of age in both quality and quantity

■ NONWOVEN fabric production for 1959 may reach a record 125 millions pounds, a report issued by the American Chemical Society weekly, *Chemical and Engineering News*, recently stated. Part of the successes are due to new fibers, synthetic binding materials, and improved webbing patterns.

The earliest nonwoven products were simple fabrics made largely from low grade cotton and waste cotton fibers laid down in a web or continuous sheet. A low cost binder, such as glue, starch, and gums, held the sheet together.

The present picture is changed in many ways, with the fabric seeing use, mostly as interlinings, in ties, suits, handbags, shoes, etc. Other items include disposable and semidurable items such as wrap-around garments for laboratory and industrial use. Durable nonwoven skirts and dresses are on the market. Nonwoven home products, draperies, towels, lampshades, etc., are on the upswing.

On the way from the beginning to the present position, nonwovens have experienced some rough sledding. Apparel uses demanded goods that draped properly, felt soft and resilient, and would withstand laundering and drycleaning. Chemists looked for binders that would support such properties.

Butadiene-styrene type binders were tried, but they smelled bad with age and had poor light and laundering properties and migrated to the surface during bonding—this is still a headache. Now, the acrylate binders are making strong bids for that market. And, while they lack something in elasticity, they have good color and odor stability.

The present advances into the clothing market have brought into use an estimated 10 million pounds of the nonwovens. Research continues to give the newcomer improved drape, better hand, and more durability to laundering and drycleaning. It is expected that the high costs of tailoring and distribution will sorely limit the use of disposable outer garments. An increase in consumption is expected, even if no more progress is made in the apparel and paper-substitute areas.

Observers predict a demand for 70 million pounds to be used in automobile quilting and padding applications, backing for plastic sheeting, laminates, filters, wiping cloths, insulation, packaging.

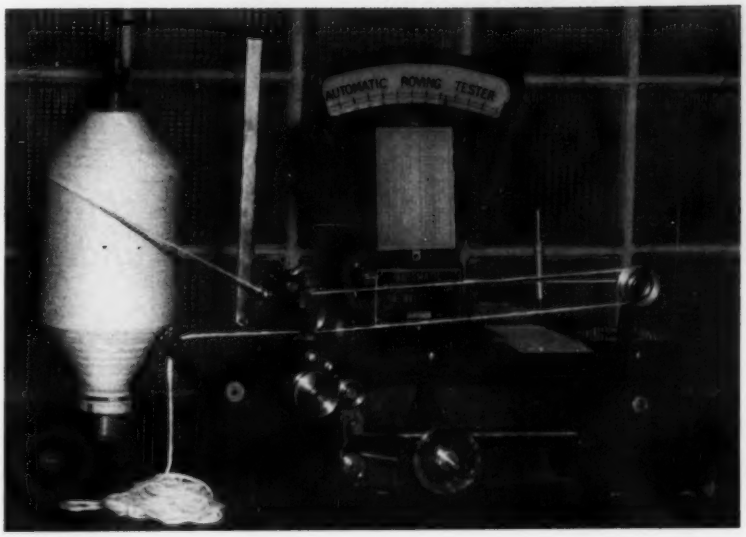
About 60 per cent of the fibers now used are synthetics, some of them the self-binding types, and about 30 million pounds of viscose rayon and about 12 million pounds of acetate and waste nylon fibers were used last year. Also about 28 million pounds of binders and 2 million pounds of thickeners, plasticizers, pigments, wetting agents, fillers, and chemical agents for resistance to fire and water are used annually—many of the problems hampering production growth fall into the laps of the chemist and the engineer. But not all do.

Somebody has to sell the product, and the going is rough enough to prompt the statement: "The textile industry is notorious for its fiercely competitive business practices, and its newest offspring, nonwovens, seems to have inherited most of its bad traits."

by Jack Simpson

Southern Regional Research Laboratory[1]

Exclusive



Get the most from your roving tester

An analysis of the principle and operating characteristics of the Belger roving tester

TWO TESTING instruments used for determining the twist necessary in cotton rovings to achieve good processing and drafting qualities are the H&B Belger roving tester and the Resistro-Rex tester[2]. Both of these instruments employ the principle that for good processing and drafting qualities, each particular hank roving should exhibit a certain resisting force at a draft of approximately 1.065. This force was evidently determined for each hank roving by experimentation and from mill practice.

Both instruments are designed to indicate when the roving exhibits this force by drafting slightly a specified length of the given hank roving. Since the principle and operating characteristics of the Resistro-Rex are similar to the Belger, the following discussion will deal only with the Belger.

The Belger roving tester is probably the oldest and most widely used instrument when determining roving twist. However, very little published information is available concerning its principle, operating characteristics, and its advantages and disadvantages in determining roving twist.

Instructions for the operation of this instrument are contained in the operating manual and a description of the methods by which the instrument can be used to select the proper tension, lay, and twist gears was contained in an article (1)[3] published in 1933. However, a number of mill operators and technicians have shown a desire, through requests received by SURDD, for a more complete description of the operating characteristics of this instrument.

It has been found through experimentation that the twist required in cotton rovings to obtain the strength necessary for good processing and drafting is dependent on the fiber properties of the cotton, fiber length distribution, and the operating conditions in the mill. Several experimenters (2, 3, 4, 5, 6, 7) have studied the effect of fiber properties upon roving twist for good spinning qualities.

Among the mill operating conditions that have been found to influence roving twist in actual practice are roving bobbin size, yarn count, the condition of the skewers, and the setting and the weights applied to the spinning frame rolls. The use of large size roving bobbins makes more twist necessary to give needed roving strength than when small bobbins are used. The spinning of coarse yarn counts causes the roving bobbins to revolve faster in the creel than when fine counts are spun from the same hank roving, thus making more twist necessary when spinning coarse yarns.

Old worn skewers and wide settings of the spinning roll require additional twist for greater roving strength and fiber control during drafting, respectively. With the use of heavy roll weights, a higher twisted roving can be drafted than with lighter roll weights. Since the above conditions vary from mill to mill, the optimum twist at one mill might not be that required at another, thereby making it impossible for a roving testing instrument to indicate precisely the optimum twist for all mills. The Belger roving tester indicates the strength required for various hank rovings

[1]One of the laboratories of the Southern Utilization Research and Development Division, Agricultural Research Service, U. S. Department of Agriculture, New Orleans, La.

[2]It is not the policy of the Department to recommend the products of one company over those of any others engaged in the same business.

[3]Numbers in parentheses are literature references at the end of this article.

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with combination upper frame and under frame cleaning unit

special air outlets are cut in the cleaner boots at the time of installation to insure proper cleaning of all parts of the spinning frame

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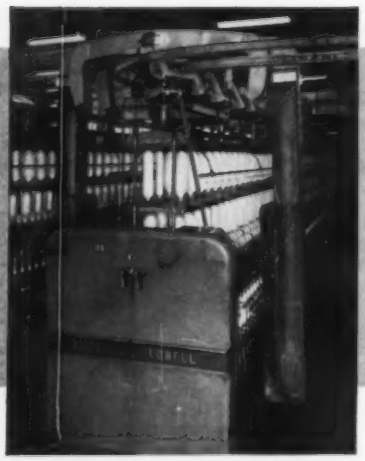
2. Necessary amount of air to clean any area can be delivered to that area.
3. Total amount of air is easily controlled by adjustable air intake.
4. Unit can be changed from closed loop operation to reversing type in minutes.
5. Four adjustable and directional creel cleaning outlets will clean all types of creels.
6. This unit cleans 20 or more frames efficiently.
7. Bolted track and standard curves make revised track layout easy.
8. Ceiling cleaning unit (over 1 horse power) will clean ceilings as far as 16 ft. away.
9. Cleaner has ample horse power to do an efficient job.



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1. All metal parts of cleaner are above head height.
2. This unit or any other American Mono-Rail unit cannot fall off the rail.
3. All boots completely flexible.
4. 50 volt—3 phase current carried in the rail. No fragile conductor bars or insulators.

MAINTENANCE FREE BECAUSE

1. All bearings are sealed.
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under average mill conditions.

Description of Instrument. A schematic diagram of the Belger tester is shown in *Figure 1*. The roving to be tested is fed between meshed step rolls A and B, which are under dead weight pressure, with B driven by bottom roll C through A.

The rate of feed of the roving between rolls A and B is 46.6 ft/min. The roving travels around a grooved roll G (inside diameter 1.10 inches) and thence between rolls A and C. Since the inside step diameter of roll A is 1.233 inches and the outside diameter is 1.313 inches, the difference results in a draft of 1.065 on the roving. Sufficient force is exerted on the different hank rovings to maintain this draft by varying the amount of weight applied to arm D at point K.

With no weight added at point K, the balance weight N is adjusted so that arm D of the combined arm DE will swing to a vertical position. This means that when pointer E is at center of scale H the combined system (LNDEFGI) is not in equilibrium, but has a resultant force at some point on arm D acting toward the center. The force exerted on the double strand of roving can be determined by the following equation:

The force to left on center pulley G is

$$F_1 \cos T_1$$

where:

T_1 = the angle between the roving and the horizontal = 4° 27' when pointer E is at center of scale H and 3° 12.5' when it is at position O and slightly greater than this at the other end.

F_1 = force in grams exerted on the double strand of roving.

This gives a counterclockwise torque on DE equal to

$$F_1 L_1 \cos T_1 \cos T_2$$

where:

L_1 = distance in inches from point P to point R = 2.40

T_2 = angle between E and the vertical

Since I is always parallel to E it may be considered to be laid on E between P and R, and since every point of F and G swing with R in identical arcs, the mass of F and G may be considered as being at R. Therefore, the whole lever system may be considered as a rigid lever DE, including the mass of EDFGILN, represented by Q, with its center of gravity indicated at C_1.

Making the above assumptions, the clockwise torque on DE due to

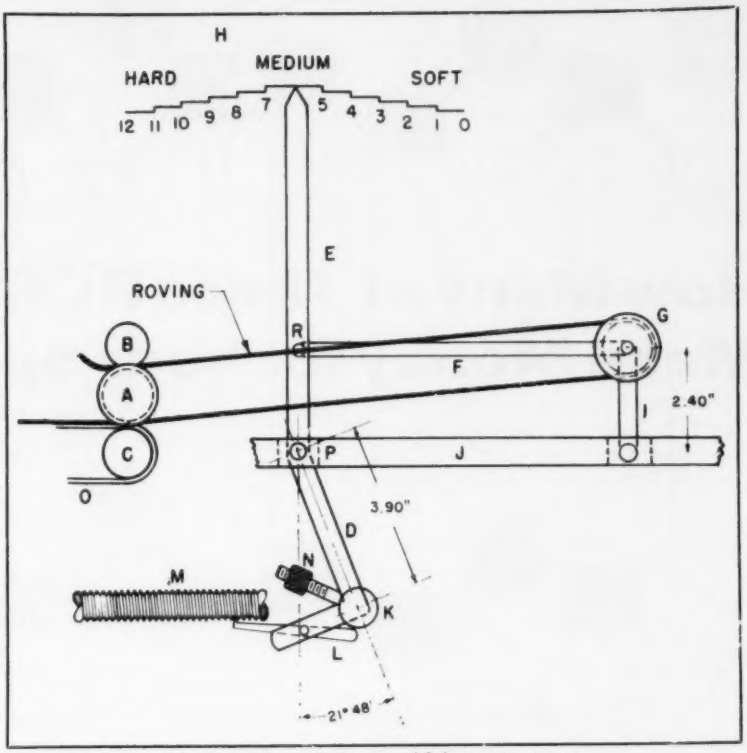
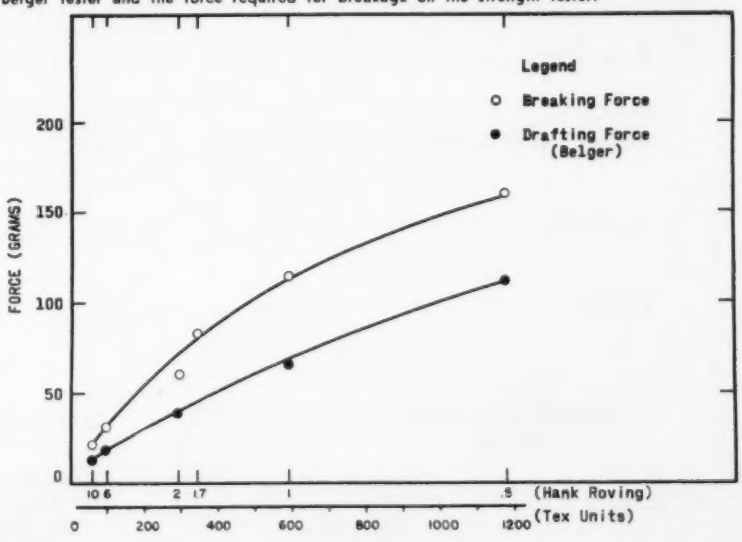
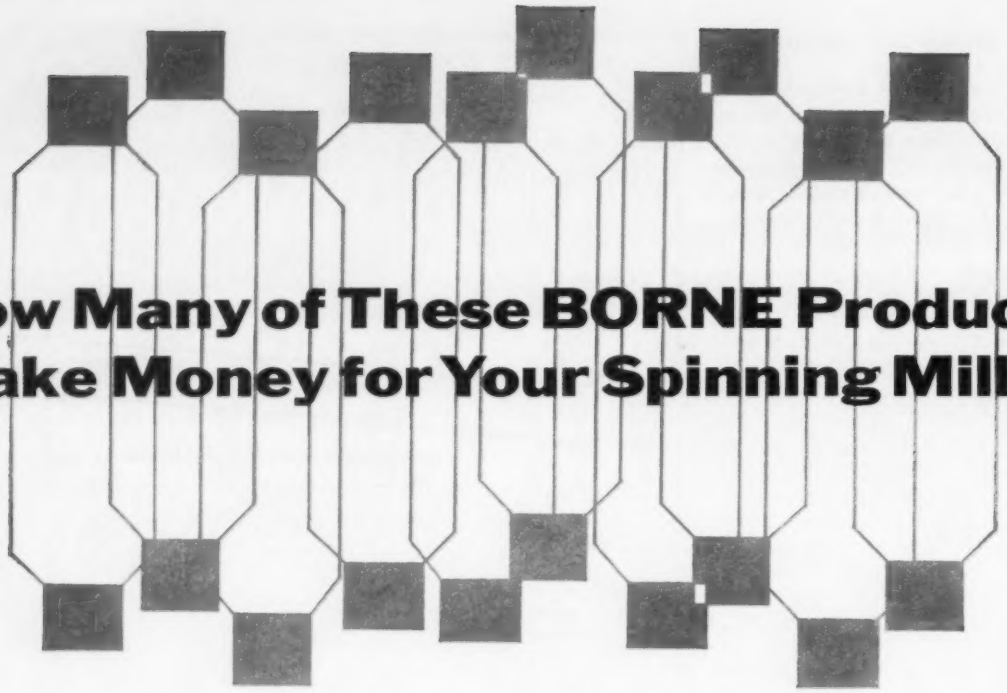


Figure 1. Schematic diagram of Belger roving tester

Figure 2. Effect of weight of roving on the force necessary for a draft of 1.065 on the Belger tester and the force required for breakage on the strength tester.





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gravitational forces would be

$$(Q_2 + WL_3) \sin T_3 \qquad (1)$$

where:

L_2 = distance in inches from point P to center of gravity of the combined system EDFGILN
L_3 = distance in inches from point P to K = 3.90
W = weight in grams added at point K
T_3 = angle between D and the vertical (21° 48' when pointer is at center of scale H)
Q = weight in grams of combined system EDFGILN for equilibrium of torques

$$F_1L_1 \cos T_1 \cos T_2 = (QL_2 + WL_3) \sin T_3$$

or

$$F_1 = \frac{(QL_2 + WL_3) \sin T_3}{L_1 \cos T_1 \cos T_2} \qquad (2)$$

which is the force in grams on the double strand of roving. The force on a single strand will be one-half this value, or

$$F_2 = \frac{(QL_2 + WL_3) \sin T_3}{2 L_1 \cos T_1 \cos T_2} \qquad (3)$$

This equation should hold for all positions of the pointer E.

The value of Q was found to be 187.52 grams. The clockwise torque given by equation (1) was measured with calibrated springs at Point K for several values of W. Equating the value of the torque times its lever arm to the right-hand member of equation (1), the value of L_2 was found to be 0.488 inch.

From observation of *Figure 1* and equation (3) it is evident that as pointer E moves towards the right of center the force on the roving becomes less, while for a movement to the left it becomes greater. A pawl L attached to arm D meshes with a worm gear M. This arrangement prevents the roving from breaking when a soft section exists in the length being tested, by allowing pointer E and wheel G to move to the right slowly instead of abruptly. This means that the strength of the weakest place in the length of the roving being tested is indicated only when the pointer E is moving to the hard side.

When pointer E is positioned at the extreme right the length of roving being tested is 27.50 inches, and is 23.87 inches when pointer E is at the extreme left, the average length being 25.63 inches. The rate of movement of worm M is such that it takes 43 sec for pointer E to move from position 6 on chart H to position O. This is a movement of 0.14 division per second.

It was found that if a weak spot in the roving immediately emerging from the contact of A and B was weaker than the weakest point in the preceding and also the following length being tested, pointer E would move to the right for approximately the next 2.75 sec, providing that the true reading of the weakest point was lower than the reading of pointer E. This would cause a total movement of approximately 0.38 division of chart H.

Thus with this instrument there are times when the strength of the weakest point in the roving being tested is not indicated, as the load of the pendulum is borne by the worm screw and not by the roving. Whenever the pointer is moving toward the right no judgment as to the strength of the roving can be expressed except that it is as weak or weaker than the instantaneous indicated value. To show how this indeterminacy can mask very weak spots consider the two

TABLE 1. Comparison of Forces Obtained With Equation 2 and Those Measured With Calibrated Springs

Roving Hank	Roving Tex	Scale Position	0	1	2	3	4	5	6	7	8	9	10	11	12
			Force in Grams												
0.40	1476	Calculated	17.0	38.2	59.0	78.5	97.5	117.5	136.5	155.5	174.5	194.0	213.5	234.0	255.0
		Measured	17.5	40.8	61.7	80.5	101.0	120.0	140.5	157.5	179.5	192.5	213.5	231	258.0
0.50	1181	Calculated	13.8	31.0	47.8	64.0	79.9	95.5	111.0	126.5	142.0	157.5	174.0	190.5	207.5
		Measured	12.5	28.1	47.4	65.8	81.5	93.7	118.2	131.0	146.0	161.0	177.5	198.5	207.0
1.00	590.5	Calculated	8.25	18.5	28.4	38.1	47.4	56.9	66.0	75.5	84.5	94.0	103.6	113.5	123.5
		Measured	8.55	17.4	26.7	37.5	45.9	56.8	65.8	76.7	82.4	95.4	105.0	118.0	134.5
2.00	295.3	Calculated	4.95	11.0	17.0	22.8	28.3	34.0	39.5	45.0	50.5	56.4	62.0	68.0	77.5
		Measured	4.10	10.5	17.2	22.5	26.3	33.7	39.3	48.8	50.5	58.0	67.5	71.2	82.7
3.00	196.8	Calculated	3.7	8.3	12.8	17.2	21.4	25.8	29.8	34.0	38.0	42.5	46.8	51.4	56.6
		Measured	3.2	6.1	11.4	16.2	23.1	27.7	32.3	37.0	41.6	44.7	49.3	52.3	57.0
4.00	147.6	Calculated	3.0	6.8	10.4	13.8	17.3	20.8	24.1	27.0	31.0	34.3	37.8	41.5	45.0
		Measured	3.2	7.2	10.9	14.5	17.8	21.6	24.7	27.7	32.3	34.7	36.9	41.5	43.2
5.00	118.1	Calculated	2.5	5.5	8.5	11.3	14.1	16.9	19.6	22.3	25.1	28.0	30.7	33.6	36.6
		Measured	2.5	5.8	8.9	12.0	14.5	17.0	20.2	23.2	26.2	29.3	31.6	33.9	35.5
6.00	98.4	Calculated	2.3	5.1	7.8	10.4	13.0	15.6	18.1	20.6	23.2	25.8	28.4	31.1	33.8
		Measured	2.3	5.1	8.2	11.8	13.6	15.9	18.6	21.4	23.1	26.9	28.5	32.3	34.7
7.00	84.4	Calculated	2.1	4.7	7.3	9.7	12.1	14.5	16.9	19.2	21.6	24.0	26.5	29.5	31.6
		Measured	2.2	4.3	7.2	10.3	12.4	14.6	17.9	20.4	20.0	24.7	27.7	31.5	33.2
8.00	73.8	Calculated	2.0	4.4	6.8	9.1	11.3	13.5	15.7	17.9	20.1	22.3	24.5	27.0	29.3
		Measured	2.2	4.3	6.8	9.6	11.5	13.6	16.6	18.7	21.5	23.9	26.2	29.3	31.6
9.00	65.6	Calculated	1.8	4.1	6.2	8.4	10.9	12.5	14.5	16.6	18.5	20.5	22.7	24.9	27.1
		Measured	1.5	4.3	6.7	9.0	10.7	12.8	15.4	17.6	18.5	21.6	24.7	26.0	29.3
10.00	59.0	Calculated	1.6	3.7	5.7	7.7	9.5	11.4	13.3	15.2	17.0	18.8	20.6	22.7	24.5
		Measured	1.5	3.6	5.8	8.0	10.0	11.4	14.3	16.3	17.7	19.3	21.5	22.4	25.4

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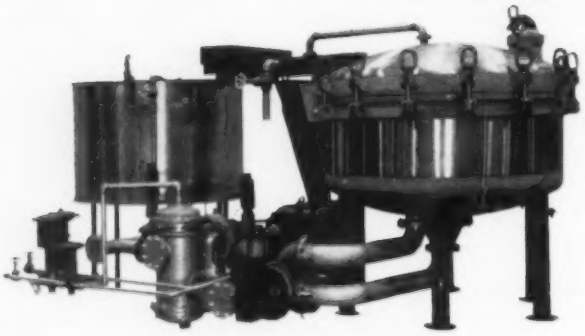
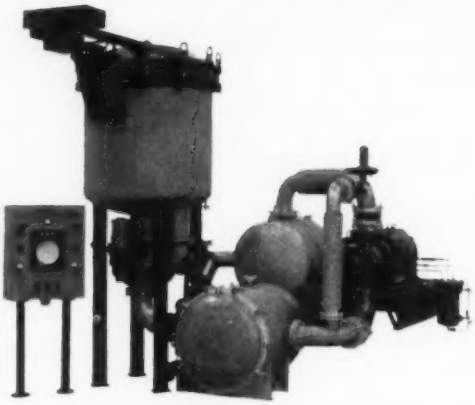


Single Kier 500 lb. Dyeing Machine



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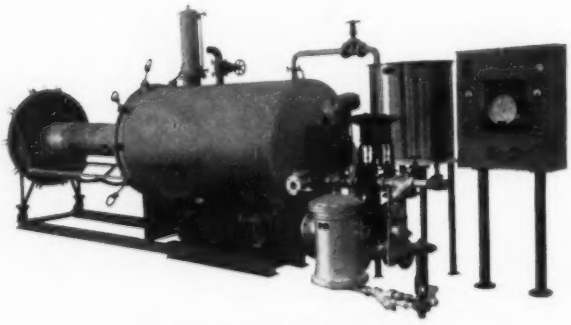

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following hypothetical rovings:

Roving A has short weak spots of true reading 5 interspersed at yard intervals in roving of reading 6, while Roving B has short weak spots of true reading 2 interspersed in yard intervals of roving of reading 6. When running these two hypothetical rovings on the Belger, identical charts will be obtained for the two rovings because while the weak spots are in the testing zone the readings are indeterminate and the pendulum is supported by the worm screw in both cases.

It should also be pointed out that when pointer E is moving to the right, the draft on the roving is greater than 1.065, and when it is moving to the left it is less.

With the use of a string and calibrated springs inserted into the position of the roving, the forces on a single strand of roving were measured for 0.40 through 10.0 hank (1476 through 59.0 tex) rovings at each position of pointer E on scale H, using the recommended weights for these rovings at point K. These forces are listed in *Table 1* along with those calculated with equation 3.

There is very good agreement between the values obtained with the springs and those calculated with the equation, thereby supporting the validity of the equation and the assumptions made for the derivation. It is believed that with means for more precise measurements the values would be identical with those obtained from the equation.

In order to eliminate the necessity for calculating the angles and to obtain an easily solvable equation the forces calculated from equation 3 were plotted against scale position for each hank roving. This plot yielded straight lines. The slopes of these lines were then plotted against hank roving which resulted in a hyperbola. Using the equation of this hyperbola as the slope of a straight line the following equation was obtained for calculating the force of the roving:

$$F = 9.505(H.R.)^{-.717}(S + 1) \quad (4)$$

where:

H.R. = hank roving
S = scale position

With the use of this equation the force for any hank roving at any scale position can easily be calculated. Another method for obtaining the forces would be to read directly off the plot of force against scale position for each hank roving, as referred to above.

The effect of roving weight (cotton count or tex) on the force necessary for a draft of 1.065 on the Belger tester and on the breaking strength of 0.50, 1.00, 1.75, 2.00, 6.00, and 10.00 hank (1180, 590, 337, 295, 98.5 and 59 tex) rov-

(Continued on page 234)

Machines handle large-volume Causticaire samples

Abstract*

■ EQUIPMENT developed by the United States Department of Agriculture permits automatic processing of large numbers of cotton samples for the Causticaire test of cotton-fiber maturity and fineness. It eliminates the hazardous customary manual treatment of test samples with caustic soda and renders the test method economical for large-volume sample processing.

The new system uses a domestic washing machine** redesigned for use with caustic soda solutions. The converted machine will treat a batch of 60 test samples in 49 minutes.

An electric domestic clothes dryer, with controls modified to give a higher operating temperature than is normally needed, completes the sample processing equipment. Ordinarily, 60 damp-dried Causticaire samples can be sufficiently dried and cooled, ready for laboratory reconditioning, in 1½ hours in the converted clothes dryer.

Compared with manual methods of processing test samples, the automatic Causticaire machine and dryer provides these advantages:

1. Reduction in the time required for treating, rinsing, and damp-drying a large volume of samples
2. Elimination of the services of a technician during treating, rinsing, and damp-drying of samples
3. Reduction of the risk of injury to the technician from contact with the caustic soda solution used in the process
4. Reduction in the time required to lower the moisture content of the caustic-free damp-dried test samples.

View of the control panel and operating mechanism of the prototype Causticaire machine.

*From the bulletin AMS-329, Apparatus for the Causticaire Method of Measuring Cotton Fiber Maturity and Fineness, by George E. Gaus and Samuel T. Burley, Jr., published by the United States Department of Agriculture, Agricultural Marketing Service, Marketing Research Div., Washington, D. C.

**Custom Scientific Instruments, Inc., Kearny, N. J., built the machines to the specifications laid down by the USDA and announces that they are commercially available.

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FOR EXAMPLE, take the matter of tensions: Because textured filament yarns are "precise" yarns, the use of post tensioning devices at the creel is very important if streaks in finished fabric are to be avoided. Equal tensions must be obtained, keeping yarns taut . . . and every end should be checked carefully.

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KNITTING SECTION

Three aids fixers should have and things they should do to

expedite f-f style changing

by Wm. D. Frye
Exclusive

A FULL-FASHIONED mill that is constantly changing styles should have an orderly method worked out for making these changes swiftly, easily, with the least amount of down time due to mistakes made in the pattern chain or the control shafts. Style changes vary greatly in different mills.

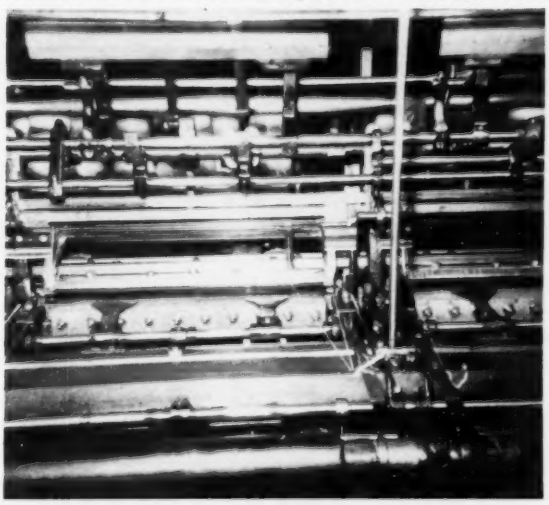
Some mills from year to year make some slight change which does not involve too much mechanical change. For example, a slight change might make a gore heel from a round heel construction, or one that would add picots in the afterwelt for a lace effect.

Possibly the change would only be a yarn change as from a 15 denier leg yarn to a two-carrier stretch yarn. If the style change is a slight one, the fixer can make this change easily enough by using the construction sheets that most mills have for their particular stocking construction. This is not the best way, but it can be done.

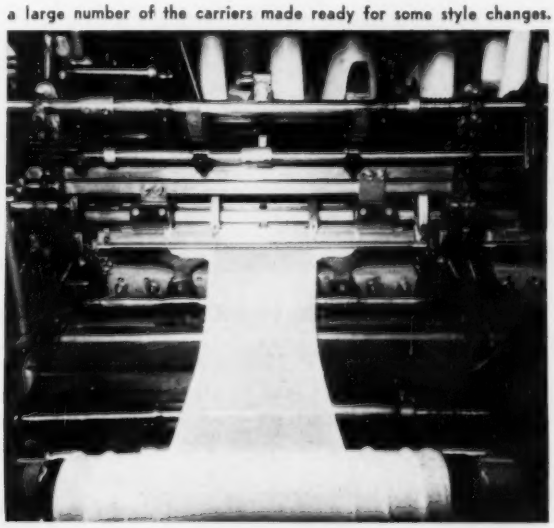
Other mills may make major changes in the stocking blank each season. These are of primary interest. A major change may include changing a 15 denier round heel construction to a mitre heel, 40 denier leg with cotton welt and sole or a 30 denier leg with a mitre heel. In these changes, different yarns and a different construction are used, which means making over the chain and control shafts. To be efficient in changes like this the fixer should have three aids easily accessible.

These aids are: (1) a construc-

Yarn carriers should be set correctly between sinkers, and . . . . .



a large number of the carriers made ready for some style changes.



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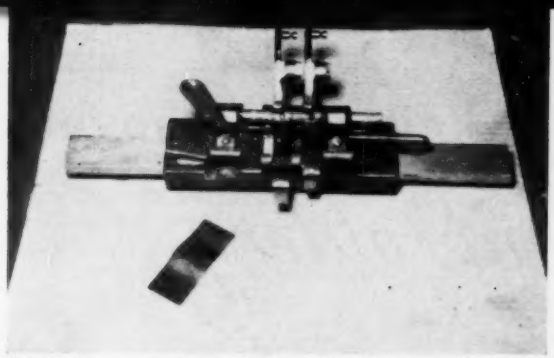
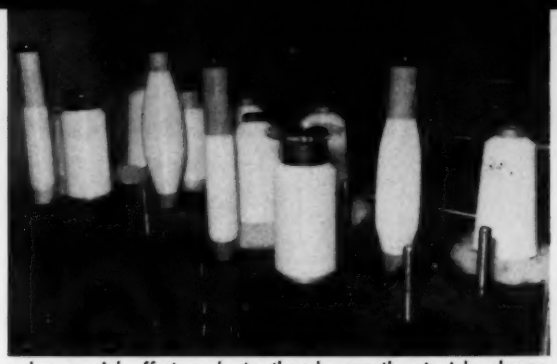


Friction box and pertinent parts must be kept in good condition



and a special effort made to thread correctly at style change.

A properly completed hosiery construction sheet, such as the one reproduced here, is a most valuable aid to the full-fashioned hosiery machine fixer.

tion sheet; (2) a chain card; and (3) a control shaft card. Each one will have to be made by the fixer and filed away for later use.

The construction sheet blanks are more or less standard and are available to the mill. After filling out this sheet it will show the fixer the yarns that are used, the needle width, pointex, and narrowing starting position, and press readings for regulating the stitch size.

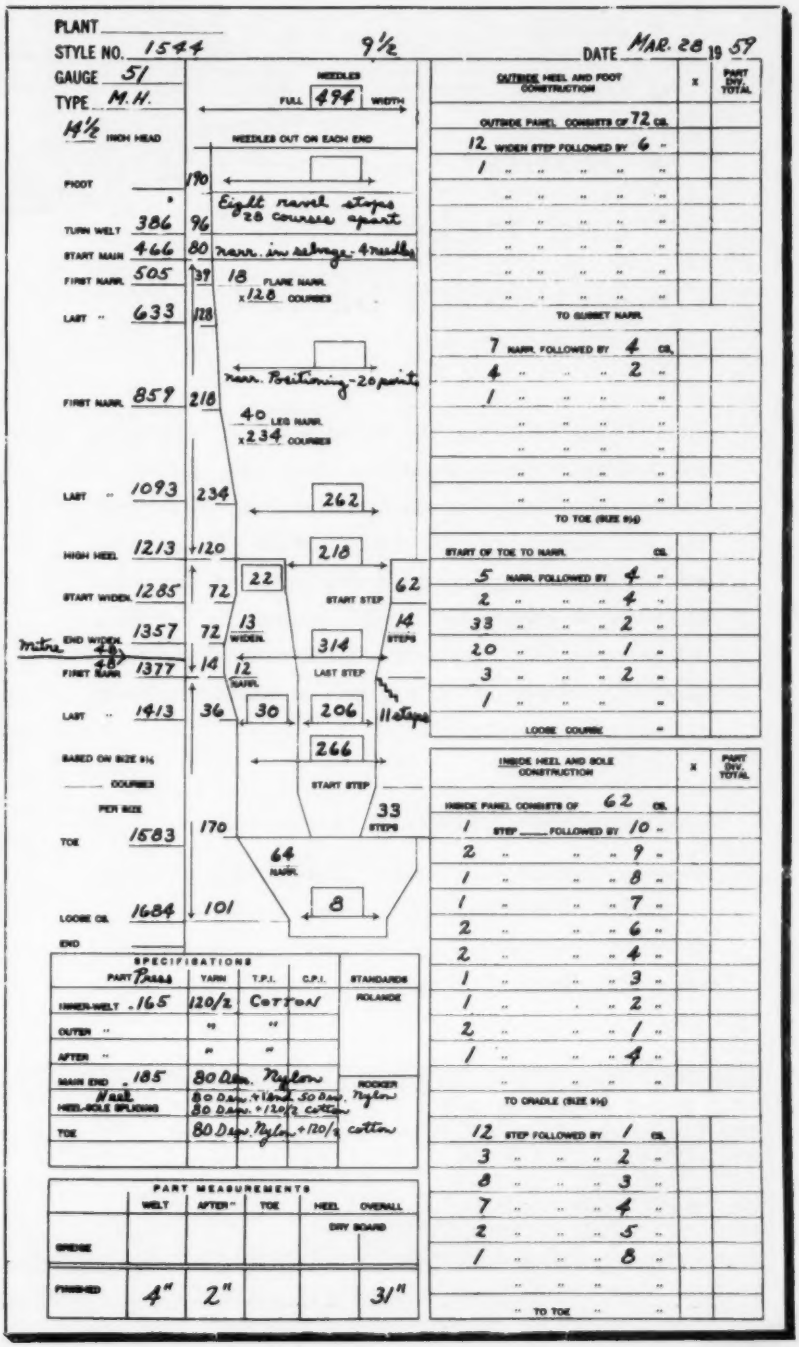
A pattern chain may be made by laying them out on the floor and using one as a pattern for making another. Upon making a major change, avoid mistakes by having a chain card for each style.

This card must be legible and show each button, courses, and the position on the pattern chain of each button. In making this card (as shown on page 177) you will note how compact it is.

On a Lieberknecht machine, there are eight levers over the chain, and each one is numbered. The chain will look like this at the beginning: On the first links there is one button on the third row, one button on the seventh row, and one double button on the eighth row. Next is one coruse followed by one button on the eighth row. Put this information down on the card being made like this:

1x3
1x7
1x8D—1—1x8

and so on through the entire chain. It is time-consuming to write the position of each button on the chain, but in the way shown all this information is condensed


PLANT
STYLE NO. 1544
GAUGE 51
TYPE M.H.
14½ INCH HEAD
DATE MAR. 28 19 59
NEEDLES
FULL 494 WIDTH
NEEDLES OUT ON EACH END
FOOT 190
TURN WELT 386 96
START MAIN 466 80
FIRST NARR. 505 39
LAST " 633 128
FIRST NARR. 859 218
LAST " 1093 234
HIGH HEEL 1213 +120
START WIDEN. 1285 72
END WIDEN 1357 72
FIRST NARR. 1377 14
LAST " 1413 36
BASED ON SIZE 9½
COURSES PER INCH
TOE 1583 170
LOOSE CR. 1684 101
END
Eight ravel stops 28 courses apart
narr. in selvage - 4 needles
18 FLARE NARR. x126 COURSES
narr. Positioning - 20 points
40 LEG NARR. x234 COURSES
262
218
22
62 START STEP
13 WIDEN
314
14 STEPS
12 NARR.
LAST STEP
30
206
11 steps
266
START STEP
33 STEPS
64 NARR.
8
OUTSIDE HEEL AND FOOT CONSTRUCTION
OUTSIDE PANEL CONSISTS OF 72 CR.
12 WIDEN STEP FOLLOWED BY 6 "
1 " " " " "
TO GUSSET NARR.
7 NARR. FOLLOWED BY 4 CR.
4 " " " 2 "
1 " " " "
TO TOE (SIZE 9½)
START OF TOE TO NARR. CR.
5 NARR. FOLLOWED BY 4 "
2 " " " 4 "
38 " " " 2 "
20 " " " 1 "
3 " " " 2 "
1 " " " "
LOOSE COURSE "
INSIDE HEEL AND SOLE CONSTRUCTION
INSIDE PANEL CONSISTS OF 62 CR.
1 STEP ____ FOLLOWED BY 10 "
2 " " " 9 "
1 " " " 8 "
1 " " " 7 "
2 " " " 6 "
2 " " " 4 "
1 " " " 3 "
1 " " " 2 "
2 " " " 1 "
1 " " " 4 "
TO CRADLE (SIZE 9½)
12 STEP FOLLOWED BY 1 CR.
3 " " " 2 "
8 " " " 3 "
7 " " " 4 "
2 " " " 5 "
1 " " " 8 "
" TO TOE "
SPECIFICATIONS
PART Picot
INNER-WELT .165 120/2 Cotton ROLANDE
OUTER "
AFTER "
MAIN END .185 80 Den. Nylon ROCKER
HEEL-SOLE SPLICING Nask 80 Den. + 120/2 Cotton 80 Den. Nylon + 120/2 cotton
TOE 80 Den. Nylon + 120/2 cotton
PART MEASUREMENTS
WELT AFTER " TOE HEEL OVERALL
GREIGE DRY BOARD
FINISHED 4" 2" 31"

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ADDS

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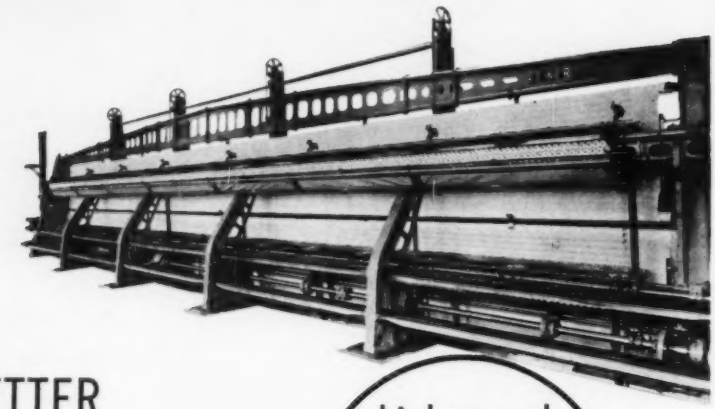
- value and
- profits

and makes

- a GOOD line BETTER



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•

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The Reiner Automatic Schiffli Embroidery Machines are the most advanced in design and motion control; they are faster than any other machine . . . and for that very reason there are more Reiners in place than all other makes combined. We have been pioneers in the American embroidery field since 1903.

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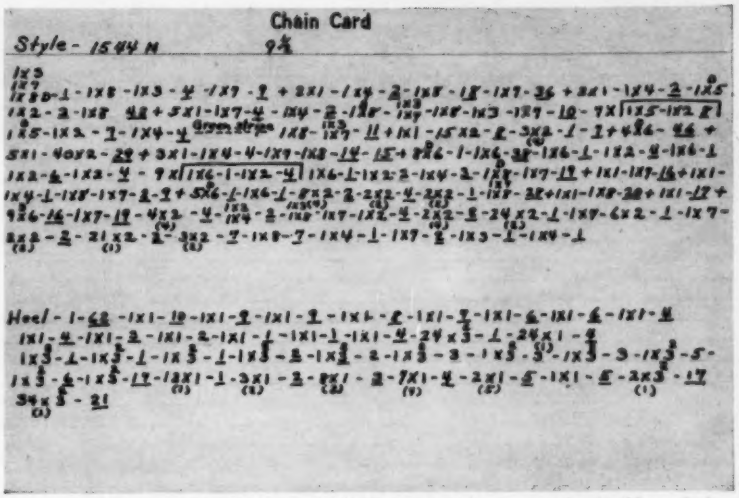
to the size of a small card.

In making the control shaft card, each segment disk is numbered, starting from press off heel. On the Lieberknecht machine the chart being made will include the upper and lower control shaft. Start with the number one flange and give the segment position number and so on until the last flange.

Understand, this is not the only way to keep a record on the different styles. In using a construction sheet only there will be a lot of groping around on the shaft changes and chain. The method used here is fast, accurate, and easy.

In style changing where there are as many as eight yarn carriers to be used, the knitter will have eight cones of yarn to watch instead of the usual four. He will have eight frictions to look out for, so all the help the fixer can give at the beginning in doing the job right will pay off in production and trips back to the machine later.



A chain card like this should be available for each style. It must be legible and show each button, courses, and the position of each button on the pattern chain.

The fixer must see that the yarn is threaded correctly. A poor job here will give trouble and continue to do so until it is corrected. All

Continued at bottom of page 180

Typical control shaft card for a Lieberknecht machine.

CONTROL SHAFTS
(Style 1544)

	Segment flange No.		Segment position			
UPPER						
	Left half					
1.	Mitre directional pawl—left		10			
2.	Mitre directional pawl—right		10			
3.	Friction for mitre blade movement		9-10			
4.	Pin stop drum	Track #1	8-11			
		Track #2	None			
		Track #3	8			
5.	Pointex stops left	Track #1	1-8	16-18		
		Track #2	1-8	16-18		
		Track #3	1-8	17-18		
		Track #4	1-10	17-18		
6.	Pointex stops right	Track #1	1-8	13-18		
		Track #2	1-8	15-18		
		Track #3	1-8	11-18		
		Track #4	1-8	11-18		
7.	Left splice friction		8-10	14-17		
8.	Right splice friction		8	11		
9.	Mitre carrier friction		9-10			
10.	Pin stop drum		None			
11.	Pin stop drum		None			
	Right half					
12.	Carrier arrestors		1-5	8-10	15-18	
13.	Center rack pawls		10	18		
14.	Center rack roller		7-17			
15.	Narrowing rack roller		7	9-17		
16.	Narrowing pawl—left		8	10	14-15	17
17.	Narrowing pawl—right		8	18		
18.	Widen out narrowing roller		8			
19.	Welt friction		None			
20.	Ringless att.		1-18			
21.	Left sole friction		11-14			
22.	Right sole friction		11-17			
23.	Right mitre friction		9-10			
24.	Splicing limit switch		4	8-18		
25.	Creep speed limit switch		1	5		
26.	Narrowing speed limit switch		1-2	9-10		

	Segment flange No.	Segment position		
LOWER				
	Left Half			
1.	Welt holders—in—	5		
2.	Welt holders—back—	4		
3.	Knock over rollers	7		
4.	Pointex chain	10-14		16-17
5.	Mitre heel rollers	12-13		
6.	Safety plate lift	1-2	6-7	12-13
7.	Rocker rollers	14-16		
8.	Welt regulator—left side	None		
9.	Welt regulator	1-8	17-18	
10.	Welt turner clutch safety lever	1	3-6	8-18
11.	Regulator (looper line)	9-10	13-16	
12.	Auxiliary catch bar rollers	2	7	
13.	Auxiliary needle bar rollers	1-2	7	14-18
14.	Press rollers	2	7	12-13
15.	For activating lace att.	4-8		
	Right Half			
16.	Knock over rollers	7		
17.	Auxilary catchbar rollers	2	7	
18.	Auxilary needle bar rollers	1-2	7	14-18
19.	Mitre heel rollers	12-13		
20.	Safety plate lift	1-2	6-7	12-13
21.	Welt turner clutch safety lever	1	3-6	8-18
22.	Welt regulator—left side	None		
23.	Welt regulator	1-8	17-18	
24.	Rocker rollers	14-16		
25.	Regulator (looper line)	9-10	13-16	
26.	Press rollers	2	7	12-13
27.	Welt rod holders—back	4		
28.	Welt rod holders—in	5		
29.	Take up rollers—kick att.	1-9	16-18	

YARN BLEACHING EXCLUSIVELY

At the Franklin Process Fingerville Plant

Bleaching of cotton yarn is not a sideline with us; it's a *specialty*. Our whole processing plant at Fingerville, S. C. does bleaching exclusively. Specialization such as this assures shade uniformity and eliminates contamination from colored yarn fly. Specialization in bleaching is only one of many advantages that Franklin Process offers. Whether your requirement is yarn bleaching or yarn dyeing, here are other features of Franklin Process Service to consider: —

FRANKLIN SPRING. This spring permits soft packages to be compressed more and hard packages to be compressed less, in the processing machine, into solid columns of uniform density. Uniform penetration of the dye or bleach liquor and uniform shades result. The 1⅝" diameter tube lessens the differential between the inside diameter and the outside diameter of the package, so the dye or bleach does not tend to concentrate on the inside. The liberal spaces between the wire spirals also permit a free flow of the dye liquor. White "cross overs" seldom occur.

LARGE BATCHES. If you need long runs of one shade, we can supply that shade in ONE DYE BATCH — up to 2,500 lbs. in size. Thus you don't have to worry about mixed batches.

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COMPANY
A DIVISION OF
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Dyers of cotton (carded, combed, mercerized) • Orlon* (yarn and tow) • *Acrilan*®** • Dacron† Textralized® • Helanca • Spun Nylon • Spun Rayon • Blends Wool & Worsted Yarn — all yarns on Franklin compressible spring exclusively.

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*Trademark for Dupont's acrylic fibre.
†Trademark for Dupont's polyester fibre.
**Acrylic Fibre by Chemstrand.

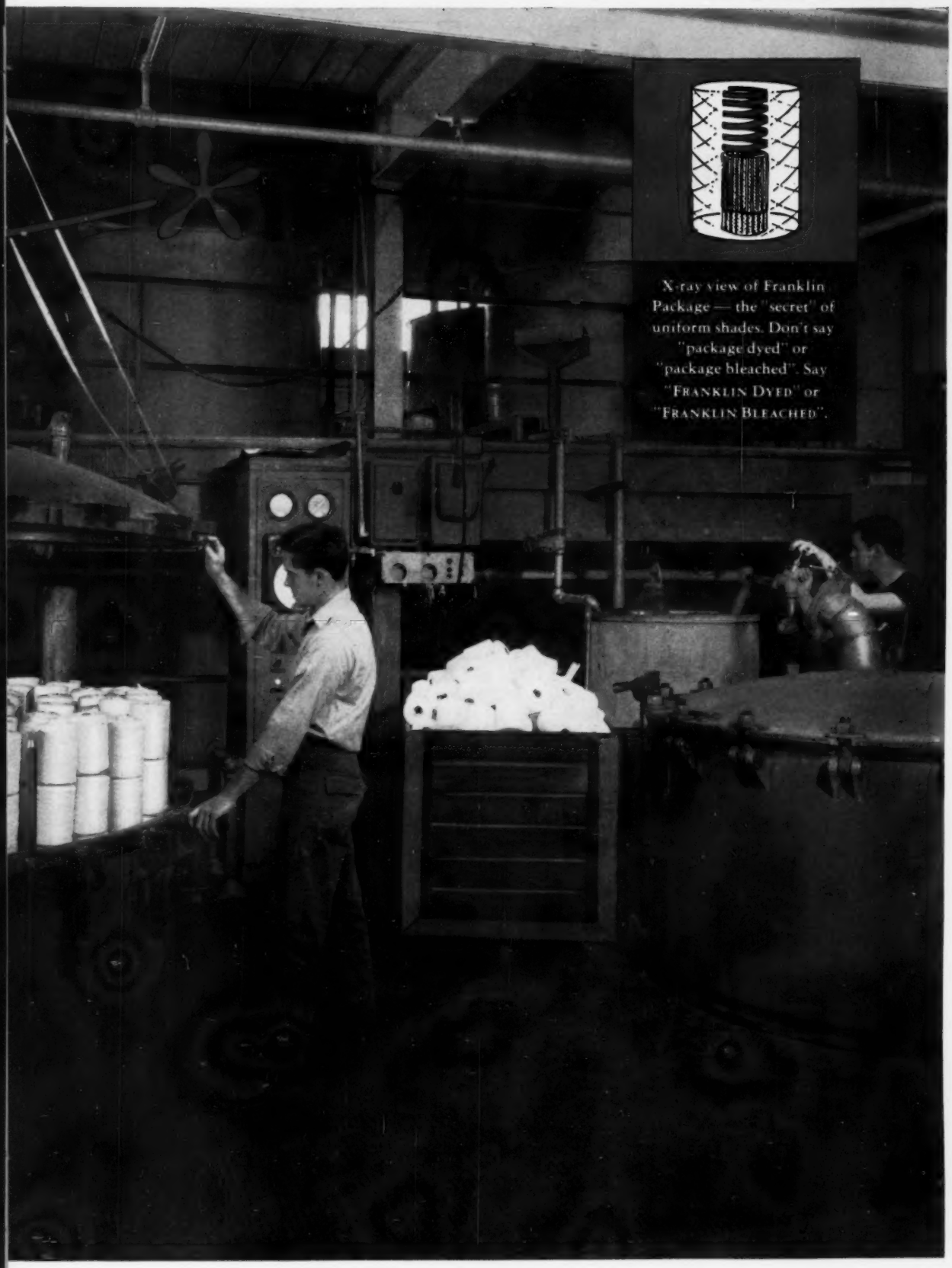
MULTIPLE MACHINE SIZES: — we have 14 different sizes of machines in our dye plants. Thus we can fit the machine to the poundage of yarn required. The proper ratio of liquor to yarn poundage is maintained. The chances of offshade work are minimized. Multiple batches of the same shade are unnecessary.

UNEQUALLED EXPERIENCE. Nothing takes the place of experience in yarn dyeing or bleaching and we have an unequalled record in this respect. In our 48 years of experience we have dyed or bleached more than 700 million lbs. of yarn for practically every branch of the industry.

LABORATORY CONTROL. Our experimenting is done in the laboratory — not in processing. When the dye house or bleachery receives your yarn, it also receives definite formula instructions. The necessity for re-processing is minimized and the quality of your yarn is safeguarded.

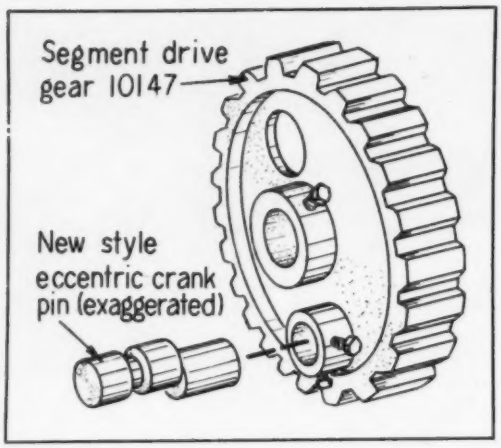
Franklin Process Yarn Dyeing Service is "conveniently yours" from 4 different dyeing and bleaching plants. Order from our nearest plant or office and get quality that is recognized by your customers and that you can point to with pride.

Interior view of yarn bleachery at Fingerville, S. C.


X-ray view of Franklin Package — the "secret" of uniform shades. Don't say "package dyed" or "package bleached". Say "FRANKLIN DYED" or "FRANKLIN BLEACHED".

Simplify Komet clutch adjustment

by K. O. Metz—Exclusive



FOR a number of years S & W Komet machines have been equipped with an eccentric crank pin #305524 in the segment drive gear #101407 in place of the old style straight pin #302139. There is of course no doubt in any Komet fixer's mind that the eccentric crank pin is a valuable improvement because it provides additional adjustment facilities for clutch shifting.

Unfortunately, when new machines are built, someone on the assembly line puts a taper pin through the eccentric crank pin and the segment gear hub. No doubt this is done to make the pin setting stay put, but this practice actually helps to destroy much of the improvement's usefulness.

Clutch shifting on today's new Komets does not create the adjusting problems found on some of the first Komets built by S & W. After machines have been running a few years, some additional clutch timing facilities will often prevent the need of advancing or retarding the clutch shifting drum. This is when and where the new style eccentric crank pin proves its usefulness, even on machines which were built a few years ago.

The easiest way to get full use of the eccentric crank pin is to knock out the factory installed taper pin and run a ¼ x 20 tap through the big end of the taper pin hole in the segment gear hub, and insert a set screw to hold the eccentric pin in place, once the proper setting has been made.

From my experience on both old and newer Komets, I would advise equipping all Komets with eccentric crank pins. This can be done by installing the eccentric crank pins when clutch trouble develops or new pinions are put in.

Sooner or later the need will arise for something to be done to keep clutches shifting smoothly and without "dragging," and eccentric crank pins properly installed and adjusted will help this.

For the benefit of some Komet fixers, including apprentices, who may not be familiar with the eccentric crank pins, the accompanying sketch may be helpful.

Most Komet fixers will remember that on early models the quality drums were not adjustable—only the clutch drum rack wheel #101387 could be advanced or retarded. When it became necessary to advance or retard the rack wheel to get good clutch shifting, then quite a number of quality drum movements would be off on proper timing of various levers.

On such machines the eccentric crank pin will come in handy, since it permits changing clutch timing by simply turning the crank pin.

We know from actual experience that two set screws will hold the crank pin in place, come what may. So don't hesitate to knock out some taper pins and give this suggestion a try. It will save time and trouble.

Style changing *(from page 177)*

carriers have to be set. Even those that have been running all right on the previous style should be checked.

When setting carriers, lock in the friction so there will be pressure against the stop as in normal running. Use carrier tube sizes in relation to the yarn the carriers will carry—a 60-gauge tube for 15 denier yarn.

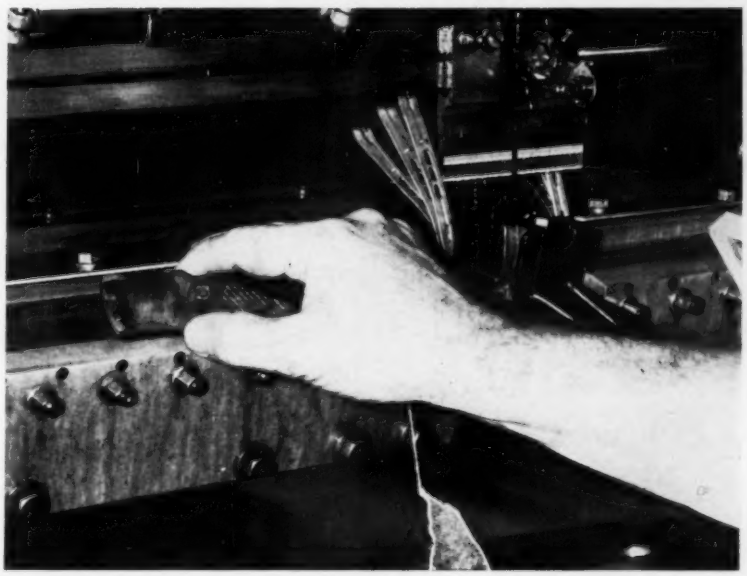
A 51-gauge tube will carry up to 80 denier nylon. For 120/2 cotton yarn, use 48-gauge tubes where the carriers will stop between the sinkers as when making the leg or the sole.

In the welt where the carriers make a full stroke to the outside of the sinkers, use a 42-gauge tube for cotton. For Helanca yarns such as 50/2 or 70/2 used in making tights, an extra large tube is needed. A discussion with the carrier tube salesman will help in this selection.

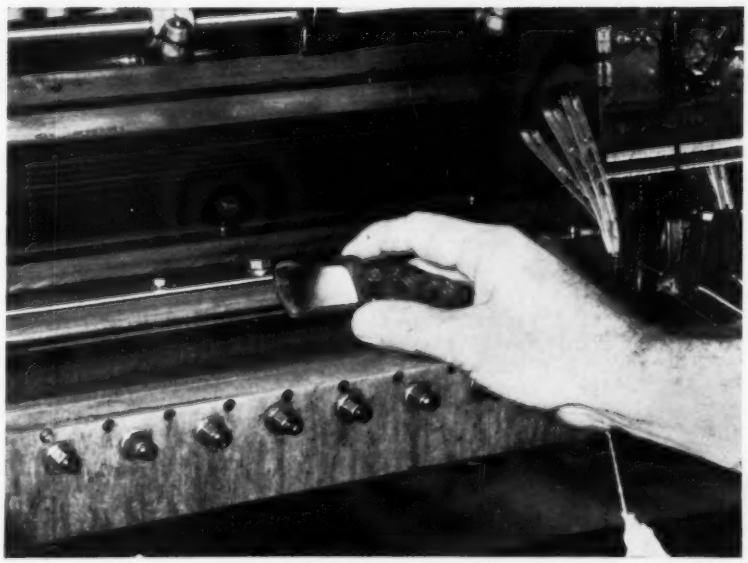
Don't forget to see that all frictions are in good condition, and put in new friction leathers where they are needed. Every fixer knows the importance of these details, but the extent to which he follows them determines efficiency to a large degree.

Double-check needle alignment!

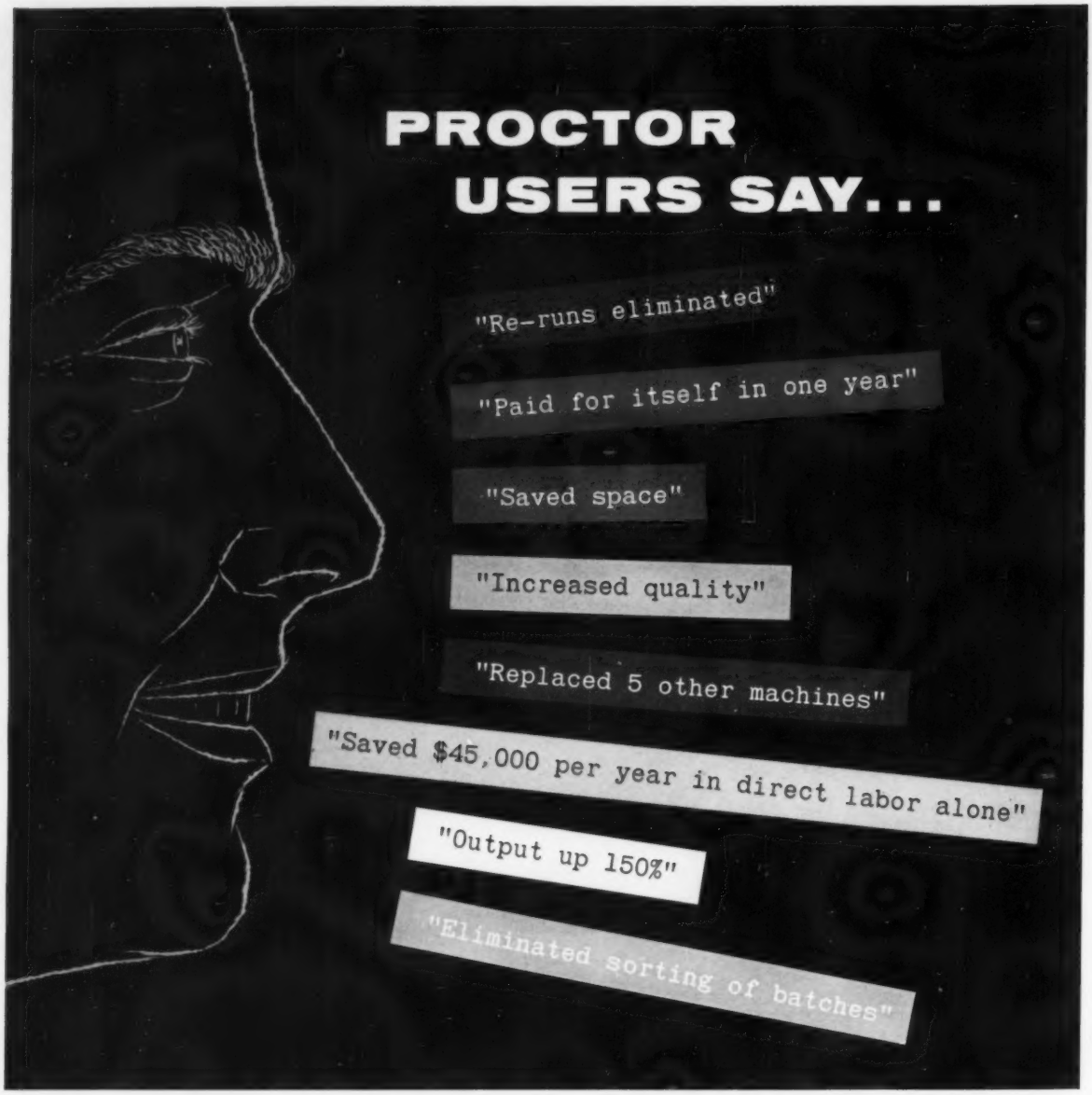
Trim along this line to post on bulletin board in full-fashioned knitting department



Plier needles so they are in the center of knockover bits when needle bars are up. A magnifying glass is helpful.



Then turn down knockover bits and check to see if needles are still in the center. Also check to see that the narrowing points align properly with the needles.



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HOW OTHERS MANAGE

Take special care in winding short-yardage packages

THE EDITORS:

Cotton mills turning out small units for sewing, such as spools of thread, and small tubes of plied yarns, must have a systematic and regular yardage check to stay legally within the prescribed yardage.

To assure that the yardages of the small units may be checked with a reasonable degree of accuracy, care must be exercised in the matter of the tension.

There should be specific instructions for all persons doing the measuring to follow. If there are items of different consistencies—i.e., hard-twisted, and soft-twisted yarns—it may be advisable to have a different approach to each. However, when all measuring is done by one or two persons, there is a possibility of getting the several methods confused. One method, if at all possible, is best.

To illustrate the need for a definite method of tension control, the following check of yardage may be of interest: two spools of sewing thread, white, ticket #50, 80 yards, were measured on an ordinary 1½-yd hand reel. Three turns were wrapped around the pig-tail. The results:

No. 1 spool measured 79¾ yards

No. 2 spool, 79¼.

The reeling from the number two spool was put on a swift and reeled on the hand reel with the end of thread running straight through the pig-tail guide. The only tension was that of the weight of the reeling and the light swift on which it was placed. It measured 78½ yards.

After removing the skein from the reel, it was put on a light swift and the end slowly pulled by hand and measured against a yard stick. The tension could be considered practically nil. It measured 78 yards.

Small units, such as spools or tubes of thread or yarn are usually wound on the winding machines with sufficient tension to build a package that is quite hard. This fact can be quite readily ascertained by feeling of a spool or tube. Therefore, after being released from the spool or tube the end of yarn, freed from its maintained pressure, has a tendency to contract in length.

The units to be checked should be selected at random from different machines so that an overall picture of the yardages may be obtained. Each mill should also set up a definite time period for testing the yardages, daily, weekly, and so on. A daily check is probably the most suitable. The quantity can then be decided upon.

CONTRIBUTOR No. 1154

REACH FOR THAT IDEA NOW. THEN—

ENTER one or more kinks, short-cuts, time savers, or quality improvement suggestions in TEXTILE INDUSTRIES Kink Contest which closes December 15. Winner of the contest gets $100, in addition to payment at present space rates for all items accepted for publication.

The contest rules are simple:

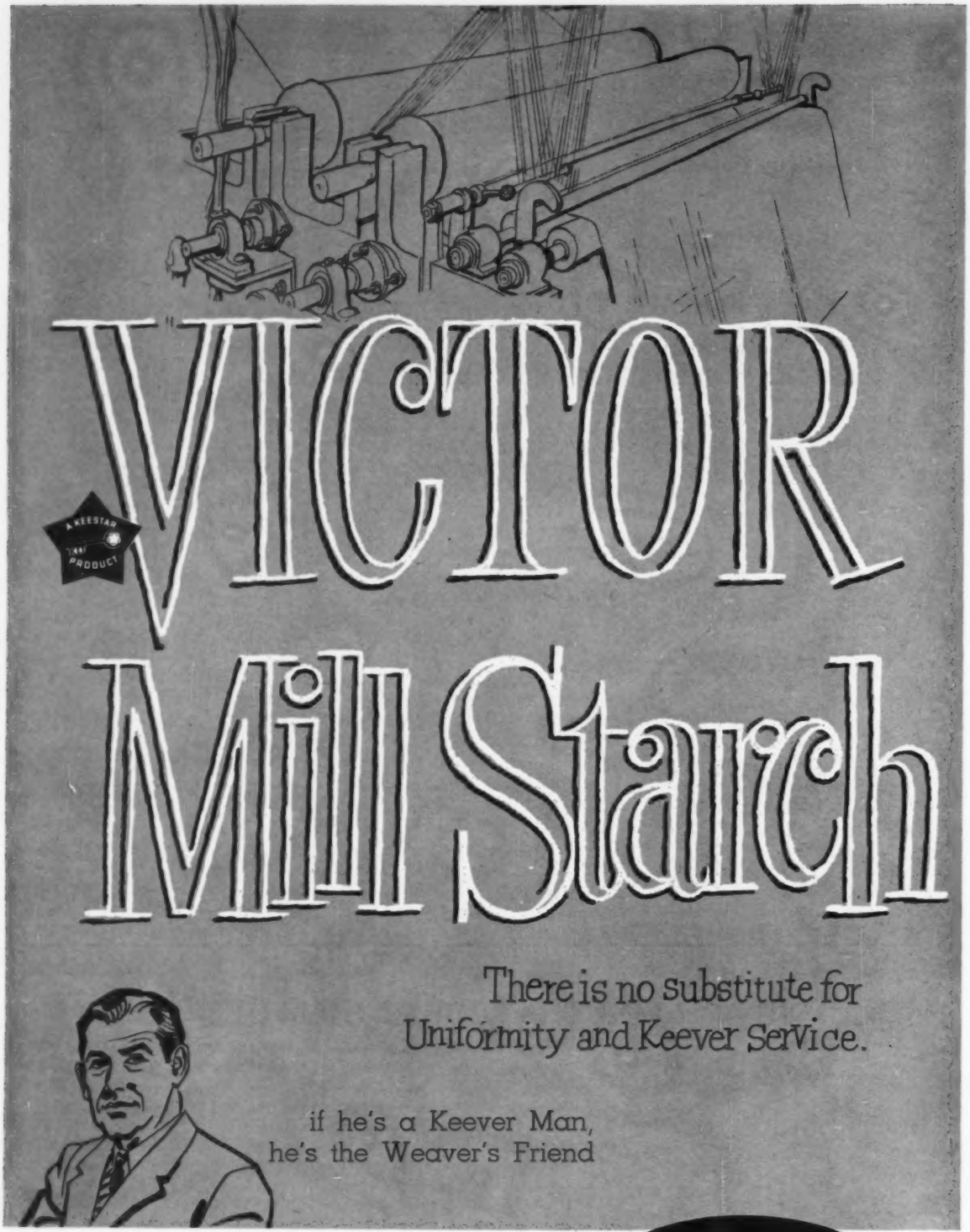
► All contributions must be postmarked not later than midnight, December 15, 1959.

► No limit to the number of entries an individual may submit in any one contest.

► All entries paid for upon acceptance — no waiting. Extra payment for photographs that are usable. Extra consideration is also given kinks accompanied by legible pencil sketches or drawings.

► Entries must not have been published previously and must not be submitted to any other publication.

► Send your contest entry to: The Editors, TEXTILE INDUSTRIES, 806 Peachtree St., N. E., Atlanta 8, Georgia.



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118 SOUTH PLEASANTBURG DRIVE
GREENVILLE, SOUTH CAROLINA

Idea for spinners troubled with slack tapes

THE EDITORS:

A good plan to follow in spinning is to have a predetermined distance for the idlers to fall in taking up tape slack, then to change the tapes when the idlers reach the deadline. If the tapes are still good, only stretched, then the seams can be cut and the tapes stitched again to the correct length.

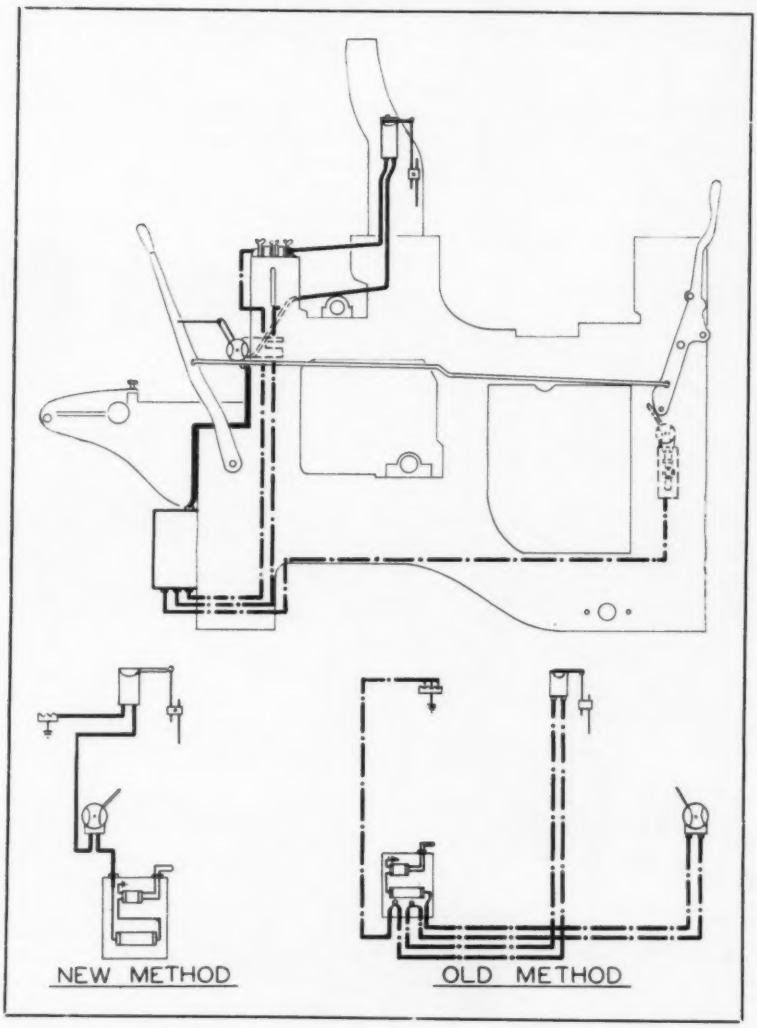
As all mill men know, slack tapes affect all the spindles driven by the individual tapes (usually four) with resulting soft twist on the spinning package and (from lack of winding tension) on the quillers. Such softness is all too often reflected in the number of sloughed fillings the cloth room has to report.

CONTRIBUTOR No. 1177

Rewiring loom stop motions? Try this

THE EDITORS:

For the past few weeks we have been working on a stop motion which will eliminate the large amount of wiring on our XL wide sheeting looms. With the help of a young electrician we have come up with what we believe to be a stop motion that is superior to the one now in operation on our looms. It permits, in addition to using less wire, the left side of the loom to be cleaned much easier.



We have been using this new method for a long enough period to determine if there were any bugs in it. So far we have found none —it has proven very satisfactory. The drawings we are enclosing of both types will make them easier to compare.

The wire we used was from the old stop motions—the old motions used about twenty feet, the new ones about five.

On the original motions the wiring runs from the switch on the front of the loom to the floor, then underneath the loom to the fuse box on the back. Then one wire is run from the fuse box to the magnet that is fastened to the loom arch. Another wire runs from the fuse box to the electrodes on the stop motion.

There are three wires coming into the fuse box from underneath, tending to cramp that condition. When a short circuit occurs it takes the electrician quite a while to trace and repair the trouble.

In trying to eliminate some of the trouble spots on the old system we moved the switch to the rear of the loom, fastening it to the side of the loom where the rear shipper handle is located. We drilled a quarter-inch hole through the rear handle. Using a short, stiff wire (or rod) we connected the handle to the switch. As the handle is pulled on the switch also is pulled on; and as the handle is released the switch is also released.

Actually we are using three ways of pulling the switch on. One is the rod or wire already described. On another we use a spring. The other is a reversal of the spring on the switch to permit the handle to knock the switch off.

We ran a wire from the fuse box to the switch. Next we ran a wire from the switch to the magnet. Then we ran one wire from the magnet to the stop motion bar electrodes.

CONTRIBUTOR No. 1188

using WHITIN AXI-FEED* OPENERS and AXI-FLO* CLEANERS is like FINDING GOLD IN YOUR OPENING ROOM...

Installed in 277 mills in 25 countries, Whitin Axi-Feed openers and Axi-Flo cleaners are performing so profitably that they are almost as valuable to their user as the discovery of gold in the opening room.

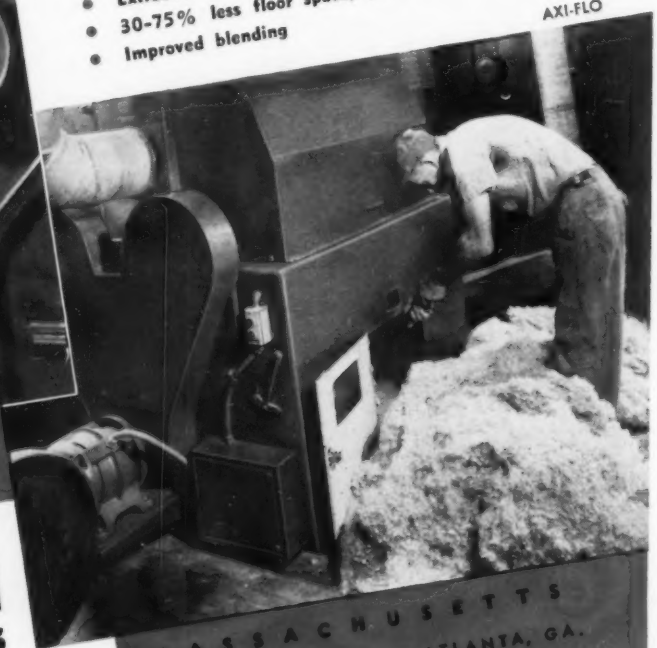
In addition to their cleaning efficiency, mill users report valuable intangible benefits such as: increased card production, cleaner card rooms, improved operations throughout the mill, and cleaner, stronger yarn.

The advantages of Axi-Feed and Axi-Flo are so numerous and their cost so moderate that every mill should enjoy their golden benefits. It will pay you to call your nearest Whitin representative today!

Performance-proved in several hundred mills, they provide:

- **Maximum cleaning**
- **Maximum cotton utilization**
  Many mills have proved that lower grade cotton can produce yarns equal in quality to higher grades formerly run — with savings up to 4¢ or more per pound.
- **Extraction of short fibers only**
- **30-75% less floor space, power, maintenance**
- **Improved blending**

AXI-FEED BLENDERS The Axi-Feed unit shown above mixing feed table can be attached to many standard blending feeders



AXI-FLO

Photos courtesy Franklin Process Co., Fingerville, S. C.

WHITIN MACHINE WORKS

WHITINSVILLE, MASSACHUSETTS

CHARLOTTE, N. C. • GREENSBORO, N. C. • ATLANTA, GA.
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DEXTER, ME.

Would a print roll recoppering plant be economical?

THE EDITORS:

Ours is one of the largest cotton textile roller printing establishments in this country, and our copper-roll requirements are necessarily large. We understand that many foreign concerns use electrolysis to recopper these rollers after they have repeatedly removed designs until the roll diameter becomes too small for further use.

We are considering putting up a recoppering plant, and we shall feel very grateful if you can help answer the following questions:

1. Is recoppering a common practice among printers in the United States?

2. Is the recoppered surface as good as the original copper surface on the rolls we get from abroad?

3. Are printing results satisfactory on recoppered surfaces?

4. Is this method economical compared with that of buying new rolls?

5. If that (No. 4) is so, will there be no necessity for ordering out any new copper rollers at all, in view of the successful recoppering results?

6. Is the recoppered surface as hard as that of the original roll?

CONTRIBUTOR No. 1142
(India)

. . . .The process of recoppering printing rollers is not a common practice among printers in the United States. This is especially true among small or medium-size firms doing diversified work.

Briefly, the process is preceded by the removal of the chromium plating after the pattern has become worn or has grown obsolete. Once the chromium is removed, the roll is turned to a new diameter, leaving a smooth copper surface free of pits, etc.

The newly turned roll is placed (not immersed) in an acidic bath of copper sulfate and mounted to turn slowly in the solution. Then the current is switched on to plate the rolls by the process of electrolysis.

Although the process is considered standardized in that uniform results are obtained, it nevertheless requires adequate supervision.

Since you do not state the size of your plant, the number of printing machines, and their schedule of operation (whether two or three shifts per day), we have no means of comparing it with operations in the United States. We thus cannot comment on the advisability of installing the recoppering process.

Moreover, you do not state how diversified you are, and diversity (as well as plant size) can influence the number of rolls that become obsolete.

In the United States, with rapid style changes and consequent rapid roll obsolescence, quite a large number of medium size plants maintain engraving and chromium plating facilities but do not possess recoppering equipment. These firms prefer to purchase new copper rolls for their own engraving.

CONTRIBUTOR No. 1143

(Electroplating started somewhere in the long ago, soon after man learned to harness electricity and make it do something useful for a change. Its principles were used in a bit of electrical research by the Scientist Coulomb, for one, who reported that an ampere flowing for one second would deposit from solution 1.1173 mg of silver. Thus, one definition of a Coulomb is simply "the amount of electrical current necessary to deposit 1.1173 mg of silver in one second."

Copper, too, has been assigned a constant that tells us how much of it can be deposited in a given time by a given quantity of current, and that figure depends on the valence of the copper being electrolyzed—0.32938 mg if the valence is two, and 0.65876 if the valence is one.

Now that we have supplied some of the history and a piece of the definition, we next look for more advice from the experts, the men who know when it is economically feasible to resort to electroplating, how to remove chromium, how to replace the lost metal by electrolysis, etc. Join us.—The Editors)

You have a mill problem?

Use TI's "How Others Manage" department to find out how other mill men have solved it.

This section is reserved for discussion of problems arising in the plant, comments on articles published in this or previous issues of "Textile Industries," and manufacturing briefs or kinks and short cuts.

Payment is promptly made for practical manufacturing information accepted for publication. Names are not used without permission.

Address letters to: The Editors, "Textile Industries," 806 Peachtree St., NE, Atlanta 8, Georgia.

British forerunner of automation?

THE EDITORS:

Although automation is a comparatively newly coined word in the English language, the textile manufacturers of Lancashire, England, were forced years ago, through labor troubles, to seek measures which probably may be assumed to be a forerunner of automation as we now understand the word.

Page 366 of the third edition of Dr. Ure's "The Philosophy of Manufactures—An Exposition on the Factory System of Great Britain," published in 1861, cites the following interesting story of how several mill owners endeavored to solve their labor problems by automation:

"... In the factories for spinning coarse yarn for calicos, fustians, and other heavy goods, the mule-spinners have also abused their powers beyond endurance, domineering in the most arrogant manner, as we have shown, over their

masters. High wages, instead of leading to thankfulness of temper and improvement of mind, have, in too many cases, cherished pride and supplied funds for supporting refractory spirits in strikes, wantonly inflicted upon one set of millowners after another throughout the several districts of Lancashire and Lanarkshire, for the purpose of degrading them . . .

"During a disastrous turmoil of the kind at Hyde, Staley-bridge, and the adjoining factory townships, several of the capitalists, afraid of their business being driven to France, Belgium, and the United States, had recourse to the celebrated machinists Messrs. Sharp and Co., of Manchester, requesting them to direct the inventive talents of their partner, Mr. Roberts, to the construction of a self-acting mule, in order to emancipate the trade from galling slavery and impending ruin.

"Under assurances of the most liberal encouragement in the adoption of his inventions, Mr. Roberts, who was then little versed in spinning machines, suspended his professional pursuits as an engineer, and set his fertile genius to construct a spinning automation. . . The problem did not puzzle him long, for to the delight of the millowners who ceased not to stimulate his exertions by frequent visitations, he produced in the course of a few months, a machine apparently instinct with the thought, feeling, and tact of the experienced workman—which even in its infancy displayed a new principle of regulation, ready in its mature state to fulfil the functions of a finished spinner. . ."

CONTRIBUTOR No. 1158

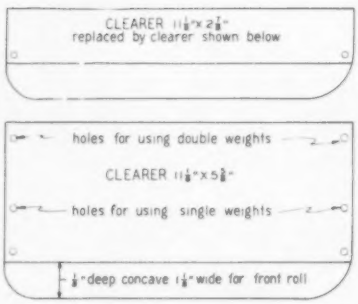
Single drawing clearer cuts cleaning time

THE EDITORS:

On our drawing frames we use a single under clearer. It is easy to get the front under clearers picked on every doff, but it seems that the draw frame tender does not give as much attention to the back under clearers as he does the front ones. And it is important to good work that all under clearers be kept clean.

Until several months ago we were using the two-clearer system —one clearer to take care of the two back steel rolls and one clearer to take care of the two or three front rolls. Then the question occurred to me: Why not make one clearer do the work on all four or five rolls, depending on the type of drawing frames used?

On the wide clearer (its dimensions on my job are 5⅝" x 11¼") we hung the weight-holding strips over the second bottom steel roll instead of over the first one. This change helps the drawing tender to pick an entire clearer with one motion. And since he formerly had two clearers to pick with one motion each, I can see only that his clearer picking is cut in half.


CLEARER 1⅛"x 2⅛"
replaced by clearer shown below
holes for using double weights
CLEARER 1⅛"x5⅛"
holes for using single weights
⅛"deep concave 1⅛"wide for front roll

CONTRIBUTOR No. 1185

Size-box-to-creel stretch affect yarn?

THE EDITORS:

We shall appreciate any aid you can give us with this question on warp sizing: We have an average of eight per cent stretch between the size box and the loom beam, but we have an extra amount of stretch between the section beams and the size box that changes with section beam diameter. With constantly decreasing beam diameters, and with the braking weights applied to the outside diameter of the section beam heads, the stretch constantly builds up between the creel and the size box. As far as we know, stretch is always measured between the size box and the loom beam, but it is not measured between the creel and the size box. What influence does that stretch have on the sized yarn?

CONTRIBUTOR No. 1083
(Mexico)

(We referred this inquiry to an outstanding authority on warp sizing; his reply is printed below.— The Editors)

. . . Before being too specific, I should know where CONTRIBUTOR No. 1083 measures the stretch on the size box. If he measures it between the finishing roll and the loom beam, he will have a lower stretch than he would get if he measures it between the guide roll going into the size box and the loom beam. In ordinary operations there is some stretch between this guide roll and the finishing roll.

Most mills measure between the guide roll and the loom beam; in this case an average stretch would probably be about one and one-quarter to one and one-half per cent.

Some mills measure stretch from the back section beam to the loom beam. The additional stretch from the back section beam to the guide roll at the size box will often run in the neighborhood of one-half per cent, so the total stretch may be one and three-quarters to two per cent on the average.

A number of mills use a high stretch for sateens and twills, finding they get a better face on the goods if they do so.

Regarding the stretch between the warper beams and the size box and the influence it can have on the yarn, I believe the stretch on the yarn when dry, if not over one-half per cent, will cause no damage. However, if the yarns are unevenly wound, excessive tension may cause breakage in the creel itself.

To decrease tension in the creel, one should be certain he is not

tightening the journals too much, for they are used for aligning the beams and should not have any braking action. Some mills weight the section beams with two ropes when they start and take off one rope when the beam is half run to compensate for change in tension due to the greater leverage created by the drop in beam diameter. A number of mills use a system in which the beam ropes are slack when running and are tightened when a slasher is stopped.

For instance, the rope can be fastened to a spring which tightens when the shipper bar handle is pushed. Also, a small lever can be arranged on the shipper bar handle (see my book, *Warp Sizing*) so that the rope weights rest on the floor while the slasher is running, but are picked up and apply tension when the shipper bar is moved to stop the slasher.

Mills that have electronic controls can use an air cylinder in place of the shipper bar lever to make the same motion of the rope and weights.

PAUL V. SEYDEL, D. Sc.
Seydel-Woolley & Co.

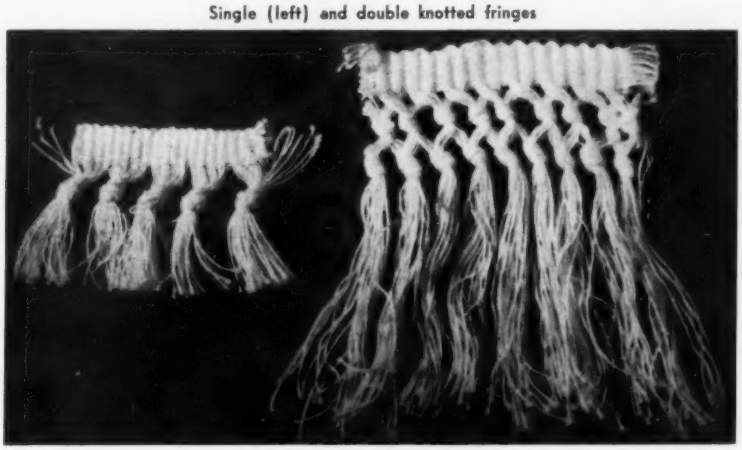
Who makes a machine to knot fringe?

THE EDITORS:

We are trying to locate the manufacturer of the equipment used in making this machine-knotted fringe [pictured below] and we shall appreciate any aid you can give us in our search.

CONTRIBUTOR NO. 1191

Single (left) and double knotted fringes



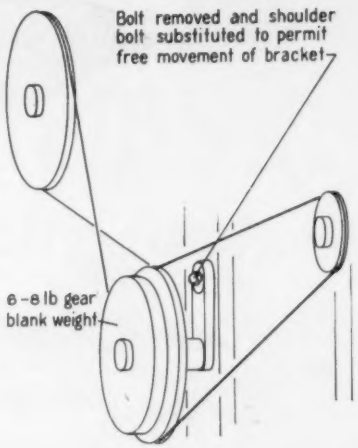
Weight keeps card comb speed constant

THE EDITORS:

Every card I know anything about uses the same technique for mounting the doffer comb driving pulleys, and all of them require periodic adjustment to keep the tension on the comb belt constant. Every carder of experience knows the results of varying comb speed, so I will not go into a lengthy discussion of that topic. But I should like to present a method of keeping the comb speed constant. Refer to the illustration.

By substituting a bolt that will permit the compound pulley bracket to swing pendulum fashion on the card side, one has simply to supply enough weight to the pulleys to allow them to seek a level that will impart proper tension to both the bands involved. This weight is supplied by turning a gear blank to a diameter smaller than the larger of the compound pulleys and mounting it on the pulley stud to give ballast.

The picture shows the blank



mounted on the outside of the pulley, but it can be put inside it just as well. Either way, it must be spaced to keep it from dragging against the pulley—a simple cut washer will do—and the fit on the stud should be tight enough to keep the blank from turning.

CONTRIBUTOR NO. 1180

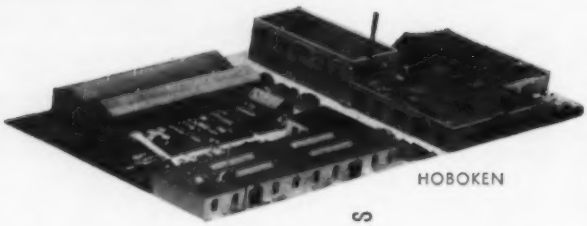
Use coffee-can keys

THE EDITORS:

There are many times when the machine fixer finds a screw with the slot so small that his usual run of screwdrivers won't fit it. He'll use his knife point or anything he takes time to find to fit the slot. A small screwdriver can be made from a coffee can key and filed to a thin point or edge. One of our fixers keeps one hanging on a nail on the cabinet door; another keeps his on his key chain.

CONTRIBUTOR NO. 1076

JOIN IN THE FUN!
Send Your Kinks To TI



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for more than 35 years

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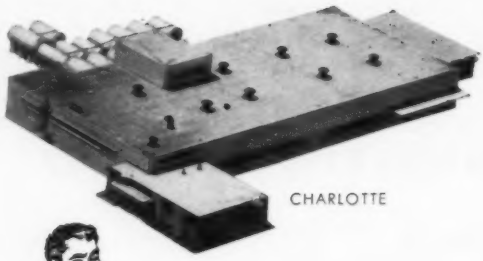

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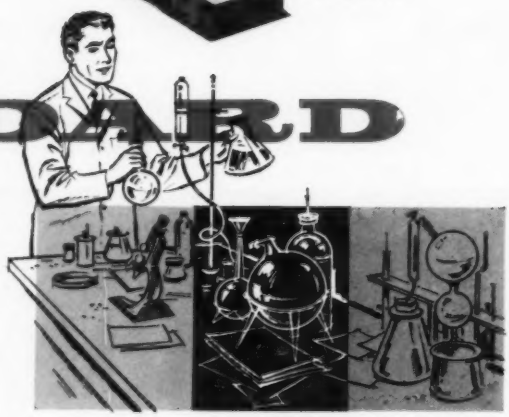

stanset 130

A low odor rapid curing resin combining good crease resistance, low chlorine degradation and high tensile and tear strength. When finished with Stanset 130, fabrics of cotton, viscose rayon, silk, wool, and mixtures of these fibers are not discolored when treated with hot chlorine solutions. It gives excellent performance for wash'n wear on white shirting fabrics.

stanset D 40

This chemical reactor resin gives standout wash'n wear. It imparts lasting wrinkle-resistance and extremely high shape-retention to dress fabrics. Even after countless washings, fabrics treated with Stanset D 40 appear fresh, starched and clean-looking. For dress fabrics that "look younger longer" Stanset D 40 is the preferred product.

catalyst 100

Catalyst 100 is an all-purpose product with a wide range of concentration and curing conditions and is recommended for all types of resins. It affords maximum bath stability. With resins where chlorine retentive properties vary depending upon finishing conditions, however, Catalyst 100 should be used. Write today for samples and complete technical information on any or all of these products.

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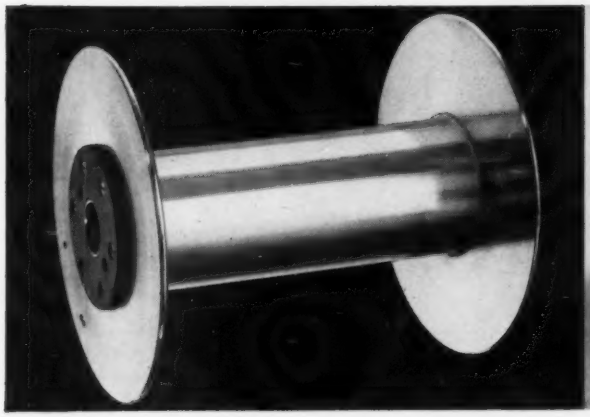
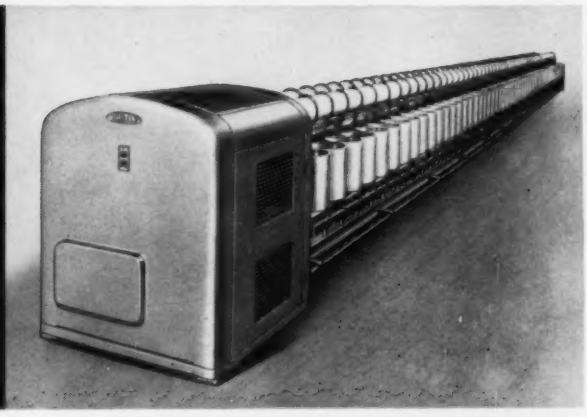
BOOST PRODUCTION 50% WITH ALUMINUM SPOOLS...

increase twister capacity too!





Some 3500 aluminum spools are now saving money for one rug manufacturer on equipment such as this Whitin Cable-King Uptwister, manufactured by the Whitin Machine Works, Whitinsville, Mass. In addition, the aluminum spools were 25% less costly than the previously used spool material.

Mills find multiple benefits by using lightweight pressure-resistant aluminum spools in Whitin's ring and uptwisters

FASTER SPEEDS: Helps attain increase in operational speeds of up to 50%.

LARGER PACKAGES: Improved technology implemented with aluminum spools makes it possible to produce packages up to 10 lbs. of yarn. This permits production of cones of equal size of plied yarn without a plied splice.

GREATER ECONOMIES: Larger packages reduce splices by 66%, thereby stepping up efficiency of subsequent processes including tufting and weaving.

A typical application of aluminum spools is the special Whitin *Spoolmatic* Winders and *Cable-King* Uptwisters which have increased carpet yarn production by up to 50%. This equipment now brings to makers of twisted yarn everywhere all the benefits of this new multiple ply process formerly enjoyed only by tire yarn producers.

The lightweight spool itself is true, sturdy and pressure resistant. It was developed by Engineered Plastics, Gibsonville, N. C.—through the close cooperation of Kaiser Aluminum. It's another outstanding example of the production advantages and economies which more and more textile companies are realizing with aluminum.

To find out how aluminum's unique combination of advantages can best serve *you*, mail the coupon today.

KAISER ALUMINUM

THE BRIGHT STAR OF METALS

SEND NOW FOR FREE BROCHURE!

Kaiser Aluminum & Chemical Sales, Inc.
Dept. TE-1087, 1924 Broadway
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Gentlemen: Please send me your free brochure detailing aluminum's advantages for the textile industry.

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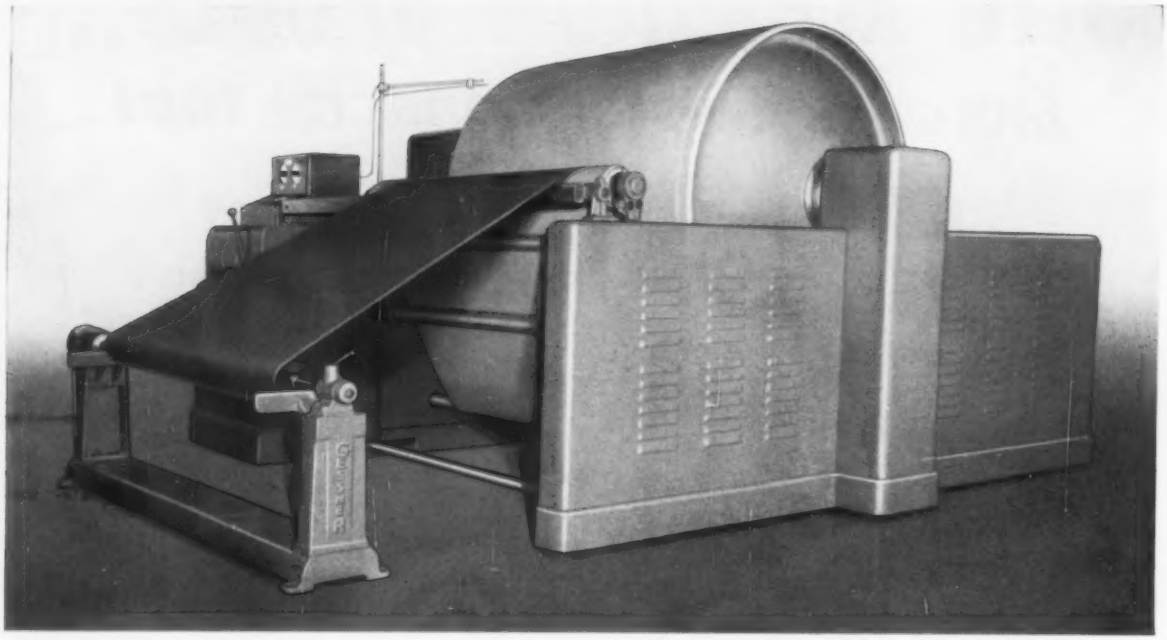
See "MAVERICK" • Sunday Evenings, ABC-TV Network • Consult your local TV listing.

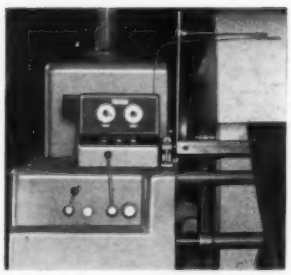
Do Your Semi-Decating with a
GESSNER VERSAMATIC



Gessner's 60" Versamatic Semi-Decating Machine.

Gessner's Versamatic Semi-Decating Machines built with 36", 48" and 60" diameter cylinders, with five important features, combine the utmost in decating quality and quantity.

1. Hydraulic drive and infinite speed variations, and controlled pressure roll; 2. High operating speeds made possible by (a) the automatic apron tension control, (b) the automatic apron guider; 3. Foolproof, internally heated steaming cylinder; 4. Throttle steam with automatic cycle; 5. 60" Versamatic will decate 8 pieces or more of woolens or worsteds, and upwards of 1000 yards of synthetics per loading.



Hydraulic drive controls and apron guide mechanisms.

DAVID GESSNER CO.

WORCESTER, MASS.

Southern Representative:
Richard A. Herard , 222 Piedmont Bldg., Greensboro, N. C.

Western Representative:
E. G. Paules & Co., 1762 West Vernon Ave., Los Angeles, California

Canadian Representative:
W. J. Westaway, Montreal, Quebec; Hamilton, Ontario

NEW PRODUCT PARADE

Please note: Claims made in all of these announcements of new developments are of necessity based upon information furnished by the respective suppliers.—The Editors.

High-density starch is easy to mix, handle

A high-density starch in granule form (Globe Brand Easy-Flow #3366) offers five basic advantages: (1) it is 40 per cent more dense than conventional starch; (2) it is more uniform in particle size, moisture content, and pH; (3) it is easier to handle in bags and to convey in bulk; (4) it provides exceptional wetting and dispersing performance; and (5) it cooks faster and more uniformly to produce a size that gives improved slashing and weaving performances.

The new starch (left test tube) occupies 40% less space than conventional starch (right test tube) as shown here.

Slightly magnified closeup of the new starch shows smooth, even appearance. Paper clip at right shows relative particle size.

The relatively high density of this new starch reduces record keeping, handling costs, and expands present storage facilities. The product resists bridging or caking, has high resistance to abrasion, and its quality keeps fines to an absolute minimum.

Because the starch does not lump or float, it can be added to water as fast as desired. It submerges and wets out instantly, minimizing premixing time.

Corn Products Sales Co., 17 Battery Place, New York 4, N. Y.

Do you want more data? Write ◂ or use card on page 209; list K-101

Electric counter speeds cloth folding

For use in cloth folding and a number of other textile mill applications is a new electric counter that is preset by the selector switches on the front panel to any number from 1 to 999.

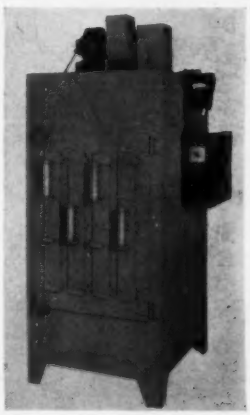
Electrical impulses are fed into the counter by an electrical contactor or photo cell. When the preset number is reached the counter will either open or close a secondary circuit. This secondary circuit can then stop or start a machine, conveyor belt, or any other type of control.

The counter automatically resets to zero each time the preset number is reached. Counting speed is 400 counts per minute maximum, and the device will reset without loss of count at this speed. A totalizer can be added to register every preset count.

WAK Industries, 1814 So. Tryon St., Charlotte, N. C.

Do you want more data? Write ◂ or use card on page 209; list K-102

Tests resin and ink drying time on knit goods

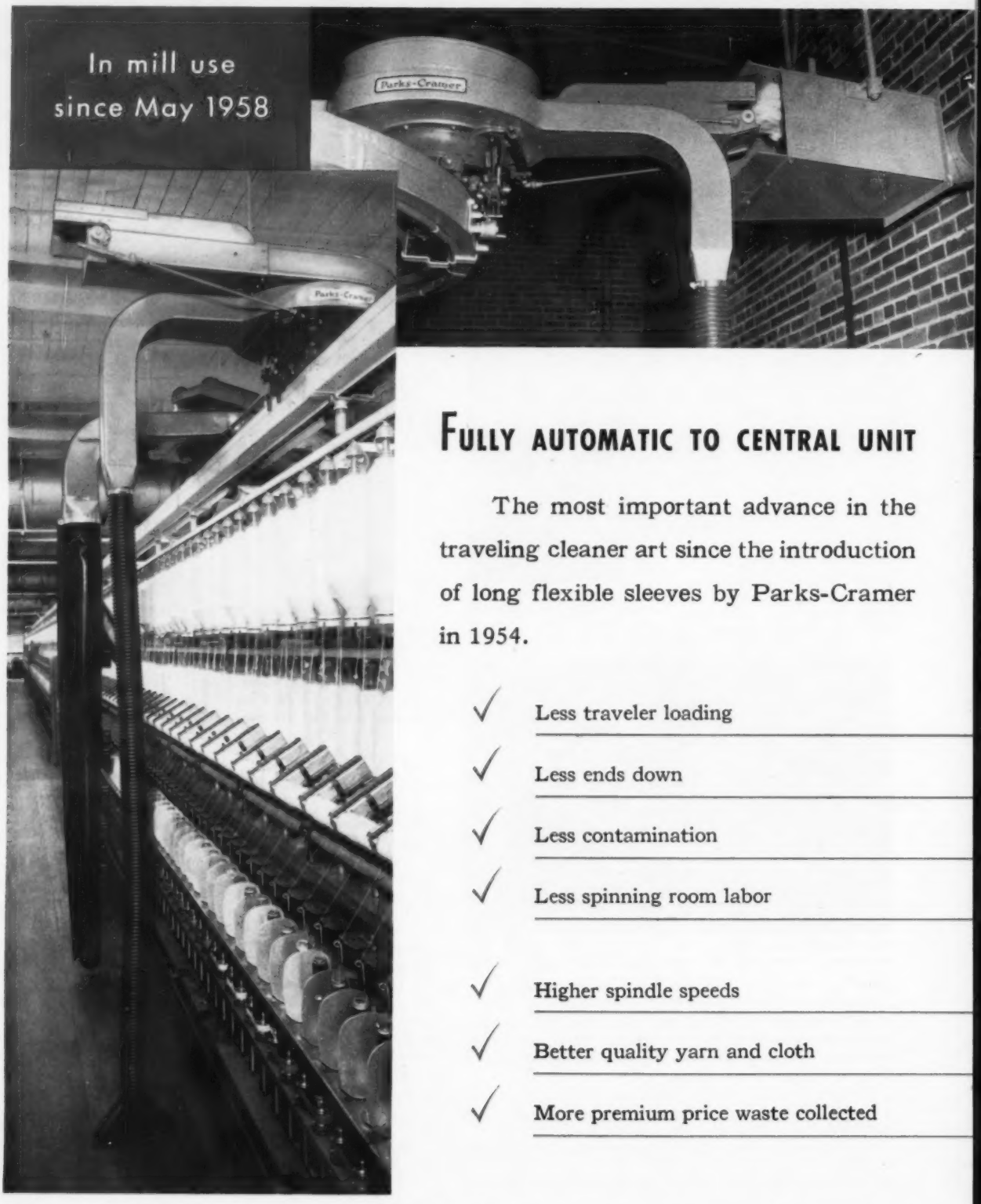


A special oven for testing resin and printing ink drying on cloth samples, also for testing thread and cloth samples where many drying applications are involved, has been developed.

Special racks are provided for pin frames over which the samples are stretched, and a full opening door contains four individual doors for easy loading of single pin frame racks. This allows maximum drying efficiency of all samples in the oven and flexibility of drying schedules to the operator.

The oven provides a maximum temperature of 450 F. It is electrically heated, has temperature indicating controller and a special convection heating system which

Parks-Cramer TravelVac

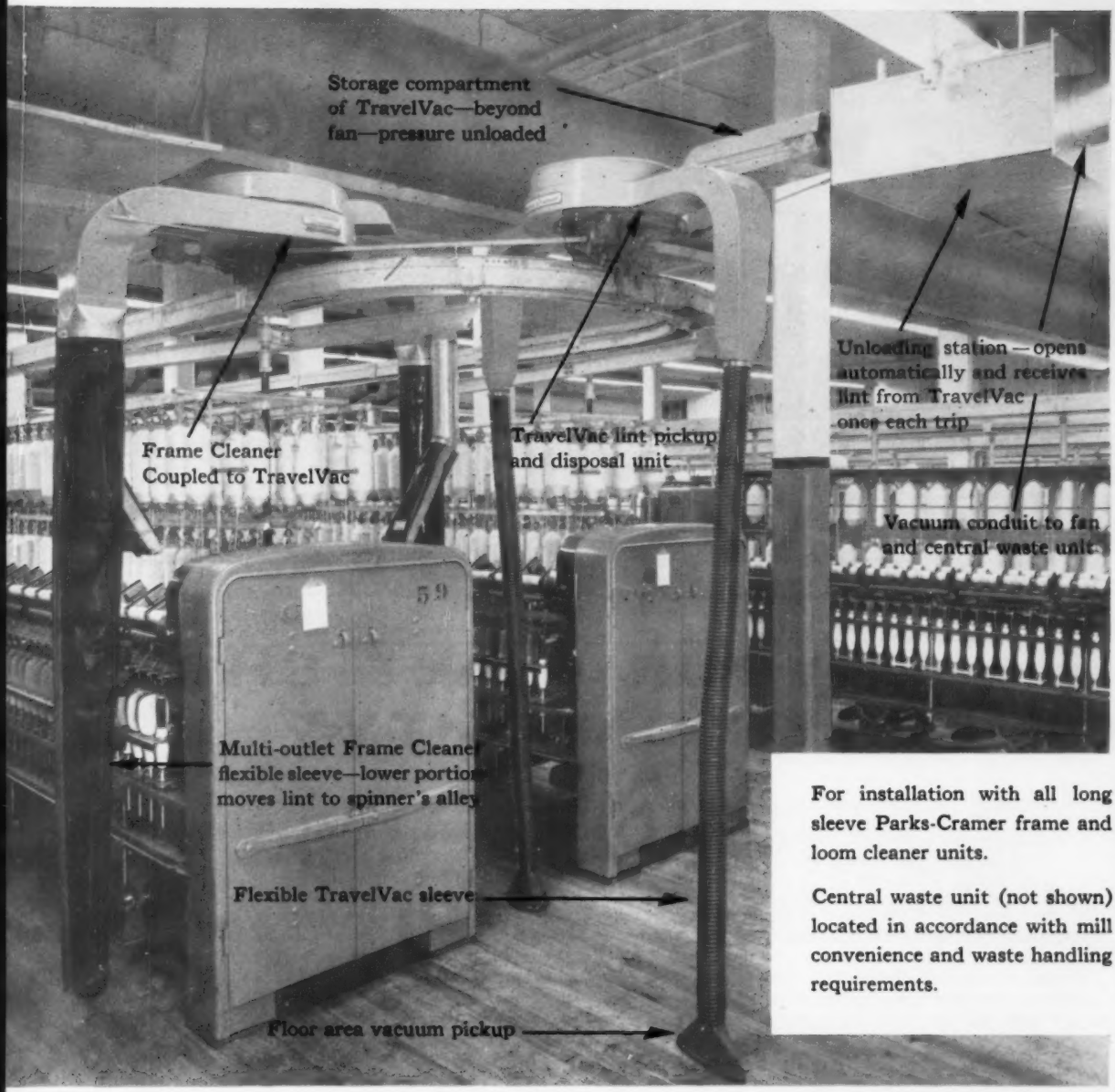


FULLY AUTOMATIC TO CENTRAL UNIT

The most important advance in the traveling cleaner art since the introduction of long flexible sleeves by Parks-Cramer in 1954.

- ✓ Less traveler loading
- ✓ Less ends down
- ✓ Less contamination
- ✓ Less spinning room labor
- ✓ Higher spindle speeds
- ✓ Better quality yarn and cloth
- ✓ More premium price waste collected

Lint Removal . . .


Storage compartment of TravelVac—beyond fan—pressure unloaded
Frame Cleaner Coupled to TravelVac
TravelVac lint pickup and disposal unit
Unloading station—opens automatically and receives lint from TravelVac once each trip
Vacuum conduit to fan and central waste unit
Multi-outlet Frame Cleaner flexible sleeve—lower portion moves lint to spinner's alley
Flexible TravelVac sleeve
Floor area vacuum pickup

For installation with all long sleeve Parks-Cramer frame and loom cleaner units.

Central waste unit (not shown) located in accordance with mill convenience and waste handling requirements.

Benefits of Frame and Ceiling Cleaning are greatly increased by Parks-Cramer TravelVac.

415

Parks-Cramer Company

Traveling Cleaners since 1926

FITCHBURG, MASS. CHARLOTTE, N.C. ATLANTA, GA.

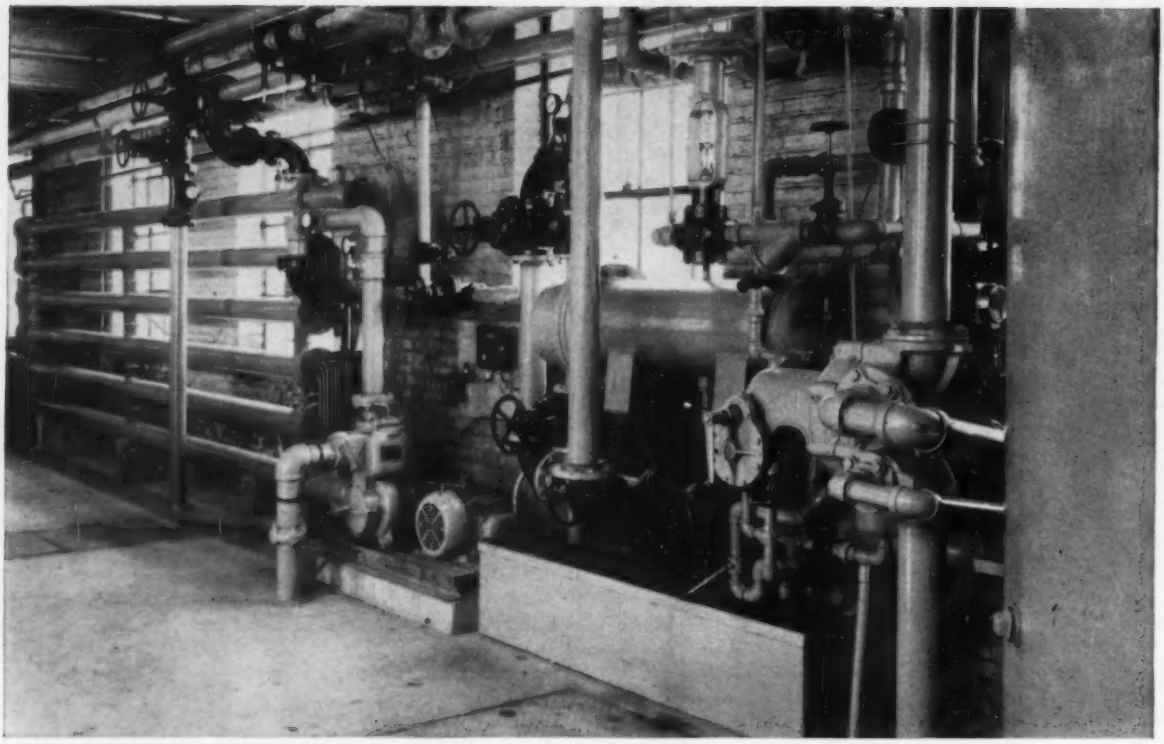


Illustration shows the hot water generating and distributing system installed by Ludell engineers. This complete system occupies only a few feet of plant floor space. Waste water pit is located below the floor.

IS YOUR PLANT SHORT OF BOILER CAPACITY?

This plant had two boilers that couldn't maintain sufficient hot water at desired temperatures. Purchase of a third boiler was being considered. Here are the results after Ludell engineers redesigned the system.

Not only was this plant short of boiler capacity, but production was delayed and quality standards endangered.

A survey was made of the complete system by Ludell engineers which showed that a third boiler to supplement the two boilers already in use was not needed.

Ludell engineers were given the responsibility of designing, specifying and procuring the materials for a complete overhaul of the system. Installation included a hot water storage tank with steel substructure, open recirculating cycle Bready System of Hot Water Heating and Bready System of Heat Recovery.

Today, this plant has plenty of hot water at controlled desired temperatures, boiler peak load levelled off, regular boiler pressure maintained, with maximum economy in preheating incoming fresh water by utilizing the recovered heat from waste water and maximum production from process equipment with an adequate steam and hot water supply.

This is another example of a plant management problem solved the easy way by consulting with Ludell engineers. This professional engineering that assures optimum results at minimum investment is available to you, too. Ask Ludell to contact you. No obligation, of course.

Ludell *Manufacturing Company*

5200 West State Street • Milwaukee 8, Wisconsin • GReenfield 6-9934

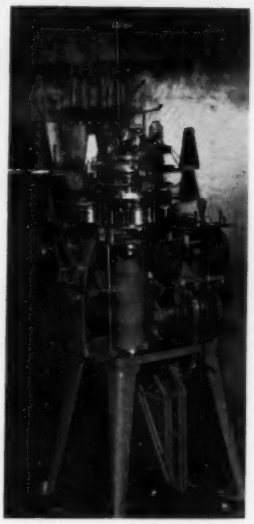
MANUFACTURERS OF LUDELL-BREADY SYSTEMS OF HEAT RECOVERY AND HOT WATER HEATING, WATER HEATERS, STORAGE TANKS, AND WHEELER SELF-UNLOADING WASHER.

provides accurate heat control to every inch of the work chamber. This heat uniformity and temperature controller assures reliable test data

Despatch Oven Co., 611 S. E. 8th St., Minneapolis, Minn.

Do you want more data? Write ◂ or use card on page 209; list K-103

Knitter combines speed, versatility



Six to seven dozen pairs of men's hosiery can be produced every eight hours on the three-pattern-drum spiral knitter called the CMP-1. Slightly more production can be obtained on boys' hosiery. The machine combines ease of handling, speed of operation, and wide versatility in duplicating any pattern desired. Containing many of the features of the Mosaic Solid Color Knitter, it is able to produce two-color float and knit patterns, mesh patterns, mock wrap patterns with three selecting stations, all types of Morpul tops, and unlimited variegated triangular or angularly disposed rectilinear patterns.

Three sets of selectors activate the 25-step rocking type pattern jack in the cylinder to select needles to take on the various colors used in patterning. Sinker head and sinker cap are arranged to reverse plait and also to make the Morpul or comfort tops. The unit is equipped with automatic cutters.

The tension control arm is activated from a six-inch drum fastened to an extension of the rack wheel shaft. This places all the tension controls to the front of the machine for easy adjustment. There are five tension racks on the six-inch drum.

The unit employs a combination stop and start system, entirely mechanical, that provides instantaneous stoppage in case of needle breakage or rubber yarn exhaustion or breakage.

H. E. Crawford Co., Inc., Kernersville, N. C.

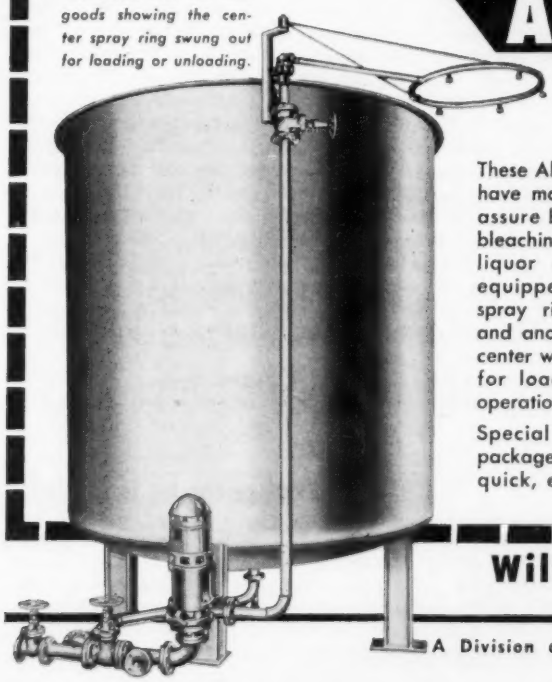
Do you want more data? Write ◂ or use card on page 209; list K-104

Changes improve auxiliary opening cleaner

Substantial improvements in dirt extraction and cleaning efficiency result from changes made in the Axi-Feed. Among the changes, which also effected simpler adjustments and maintenance, are: (1) the all-metal, 15-inch-diameter doffer cylinder and Axi-Feed cylinder are placed in the same horizontal plane; (2) grid bars located under both cylinders—14 adjustable and one fixed bar under doffer cylinder; seven adjustable and one fixed pin grid bar under the Axi-Feed cylinder—result in the removal of more heavy particles, etc.; and (3)

Especially Designed for Bleaching **KNIT GOODS**

The Allen Kier for knit goods showing the center spray ring swung out for loading or unloading.



ALLEN Stainless Steel KIERS

These Allen stainless steel kiers have many advantages which assure better, more efficient bleaching. For finest bleaching liquor coverage, they are equipped with a stationary spray ring on the periphery and another ring covering the center which can be swung out for loading and unloading operations.

Special prefabricated unit-package construction permits quick, easy installation and lower cost maintenance.

SPECIAL ADVANTAGES

- **Lower cost non-stretch operation**
- **Positive temperature control**
- **Controlled circulation for efficient bleaching**
- **Smooth stainless surfaces eliminate rust, snag and rub marks — save chemicals**

Write today for circulars giving complete information on this as well as "Package Design" cloth kiers and kiers for absorbent cotton or cotton batting.

William Allen Son's Company

SHREWSBURY • MASSACHUSETTS

A Division of O. G. KELLEY & COMPANY, Boston 22, Mass.

WHEN BOTH STEAM and MOTION ARE "MUSTS"—

Use Only
UNIVERSAL
"UC3" STANDARD
All-Metal
Bronze *Flexible*
CONNECTORS

- Completely Leakproof.
- Resists Corrosion.
- Simplifies Misaligned Hookups.
- Installation Time Saved.

Ask for Bulletin IPB Sec. 7A.

QUALITY . . . *All-Metal* Flexible Hose Products

Universal METAL HOSE CO.

2109 South Kedzie Avenue • Chicago 23, Illinois

Hunting for profits?

With summer weather past, now's the time for new DIAMOND FINISH rings. Aim for better running work. Bag the added production that's tied down in your machinery by worn rings.

P.S. We have ample STEEL to fill orders promptly.

WHITINSVILLE (MASS.) SPINNING RING CO.

DIAMOND FINISH

Makers of Spinning and Twister Rings since 1873

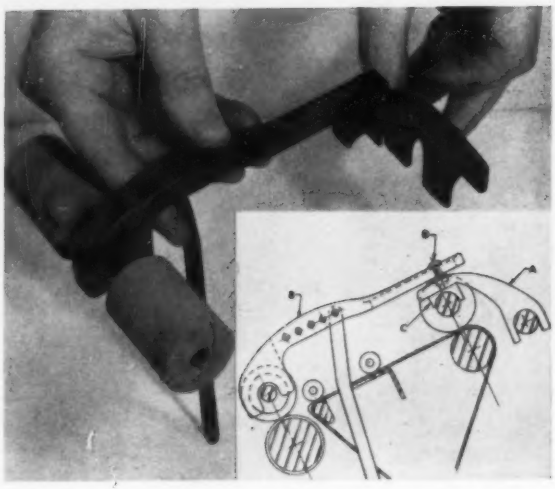
Rep. for the Carolinas & Va.: W. K. SHIRLEY, P.O. Box 406, Belmont, N. C.
Rep. for Ala., Ga. & Tenn.: H. L. WILLIAMS, Box 222, West Point, Ga.

self-cleaning baffle plates have been placed above the Axi-Feed cylinder. This member is a solid metal plate with one large center opening to which the dust is drawn. The Axi-Feed attachment may be applied to most conventional feeders now used in American mills.

Whitin Machine Works, Whitinsville, Mass.

Do you want more data? Write ◆ or use card on page 209; list K-105

Changeover for extra-long-staple spinning



The original Dixon "Saddle Guide" is available for spinning frames equipped with Z-2 and Z-5 drafting systems. The system replaces the top front roll cap bar assembly with a self-aligning antifriction front roll. The self-aligning front roll reduces ends down and increases yarn quality. It never needs relubricating.

Available also is a changeover to convert "Z" spinning to handle cotton fibers. The simplest of these involves the addition of a middle top roll apron and cage, along with necessary component saddle weighting parts. Other remaining parts on the frame can be utilized, permitting a change back to "Z" spinning at pleasure. Parts are available for a more permanent change, too.

The "Z " spinning construction consists (refer to the illustration) of a back saddle bracket "A" in a front saddle guide "B" and necessary top and bottom rolls. The back saddle bracket fits over the back bar rod and extends up over the back top roll. The Rulon bearing "C" never needs lubrication.

The front saddle guide is pivotally connected to the back saddle bracket by a ball and socket connection. This pivotal connection allows the front top roll to align itself, guaranteeing correct positioning of top and bottom front rolls.

Dixon Corp., P. O. Box 7, Bristol, R. I.

Do you want more data? Write ◆ or use card on page 209; list K-106

Ceramic thread guides for loom winder

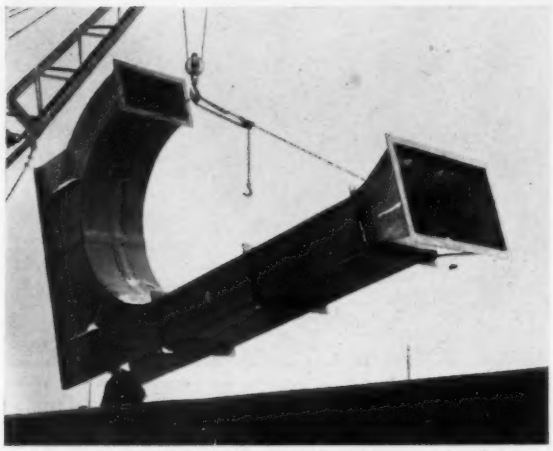
Unifil loom winders may now be fitted with Alsimag thread guides (made by American Lava Corp.) at all seven yarn contact positions. Replacing glazed porcelain, the guides are made in four shapes from ceramic materials that offer many times the wear resistance of ordinary guide materials. They offer dependable ten-

sion control, since they are of satin finish, have a low coefficient of friction, and are hard enough to resist grooving indefinitely.

Universal Winding Co., P. O. Box 1605, Providence 1, R. I.

Do you want more data? Write ◂ or use card on page 209; list K-107

Fiber glass J-boxes require little upkeep



A fully assembled 18" x 36" fiber glass J-box is placed into a railroad car for shipment to a wet processing plant.

J-boxes fabricated from self-supporting, resin-bonded glass fiber are rugged, strong, light in weight, completely corrosion resistant inside and out, do not require painting, are virtually maintenance free, can be made to any required size or shape, have smooth interior joints, and are free of protruding gaskets and material joints.

Components may be assembled in the mill if this simplifies installation.

Supplementing the J-boxes are numerous items such as tanks, hoods, fans, etc., that are built to specifications.

du Verre, Inc., Box 37, Arcade, N. Y.

Do you want more data? Write ◂ or use card on page 209; list K-108

New fibers and yarns

A series of synthetic textile yarns contains six groups especially "tailored" for applications ranging from nautical ropes to coaxial cable braid. The yarns are offered in round, flat, oval, or ribbon shapes in sizes ranging from 6 mils to 35 mils in six colors. The six yarns, all called Royalene, are:

(1) A high-tenacity linear polyethylene having high strength, heat, abrasion, and chemical resistance; called type A.

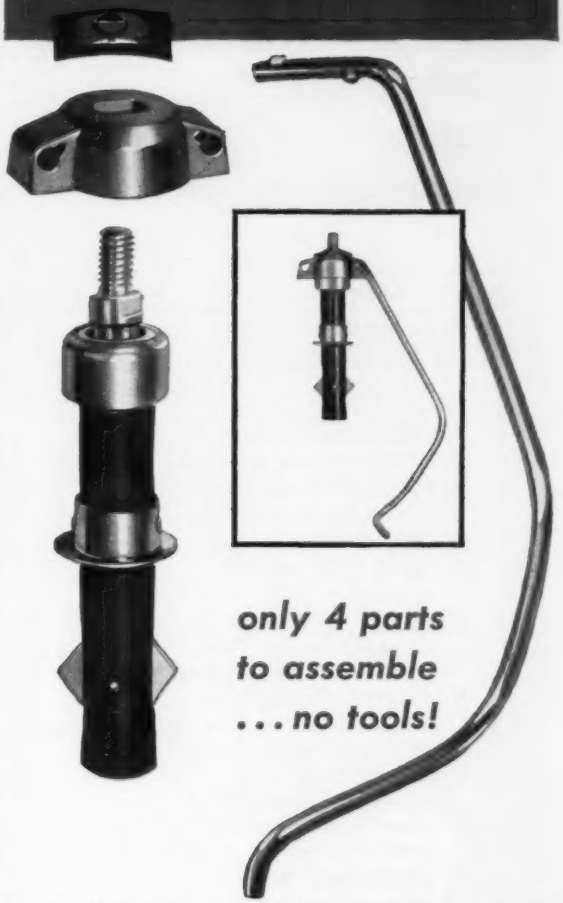
(2) A yarn specially compounded for shrinkage, for heat and chemical resistance, providing unusual effects such as three-dimensional fabrics; designated type C.

(3) A yarn with very high shrinkage in boiling water, making it useful for pronounced effects either alone or with other fibers; type E.

(4) An electrical grade for applications requiring conformity to Bell Laboratories' specifications for insulation; type L.

(5) A polypropylene for high heat resistance and,

NEW BENDIX SPIN-MASTER BOBBIN HOLDER



New simplified design . . . with only four, easy-to-assemble parts! New modern plastic construction . . . for lighter weight, greater efficiency! That's the *new* Bendix Spin-Master—the most modern bobbin holder in the textile industry!

By replacing steel tubing with Kralastic, a tough, durable plastic, the Spin-Master is lighter, less complex, lower priced. A new die-cast, all-purpose dust cap incorporates a positive locking device that assures uniform tension . . . permits yarn to flow freely from the full or partly full package.

Order the new, improved Bendix Spin-Master, or that long time favorite of the textile industry—the Eclipse* Bobbin Holder—from the nearest supplier listed below. *REG. U.S. PAT. OFF.

ALL OTHER INQUIRIES TO:

Bendix-Elmira

Eclipse Machine Division • Elmira, New York

Bendix AVIATION CORPORATION

Odell Mill Supply Co., Greensboro, N. C. North Carolina • Virginia	Export Sales: Bendix International, 205 E. 42nd St., New York City
Greenville Textile Supply Co., Greenville, S. C. South Carolina • Georgia • Alabama • Tennessee	FURNISHED AS ORIGINAL EQUIPMENT BY LEADING TEXTILE MACHINE MANUFACTURERS

Give your
WASH 'n WEAR FABRICS
TOP QUALITY
with a
PROCTOR FINISH

Proctor Chemical Company specializes in the development and manufacture of wash and wear fabric finishes. When you use Proctor Finishes for wash and wear fabrics, you have the assurance of top quality. Let a Proctor representative explain the application and properties of these wash and wear fabric finishes:

1. **PROTOREZ EU-50:** Cyclic ethylene urea resin
2. **PROTOREZ EU-50 LF:** Low formaldehyde cyclic ethylene urea resin
3. **SAFE-T-SET RESIN:** A triazone resin
4. **HYSET D:** Outstanding for fabric stabilization and permanency to washing
5. **CURITE CATALYSTS:** Complete line for the cure acceleration of thermosetting resins
6. **MELOTONE X-2:** Durable softener designed for plasticizing thermosetting resins producing unique softening properties
7. **PROTOREZ BEU:** Very economical low chlorine retentive resin
8. **PROTOLUBES:** Tailor-made products to improve abrasion resistance and tear strength
9. **SEWING LUBRICANTS:** For reducing needle cutting; thus improving seam efficiency
10. **PROTOMINES:** Cationic and Nonionic softeners

Write for samples and technical bulletins—no obligation.

PROCTOR CHEMICAL CO.
INCORPORATED
SALISBURY, NORTH CAROLINA

Staple, yarn, and fabric made from the new low-denier polypropylene fiber now being produced by Reeves Brothers, Inc.

resistance to creep under sustained loading; type P. Polypropylene also lends itself to multifilament applications.

(6) A high density copolymer polyethylene having superior resistance to creep under load, and retaining physical properties of the highest grade linear polyethylene; type N.

United States Rubber Co., Royalene Dept., 10 Eagle St., Providence, R. I.

Do you want more data? Write supplier or use card on page 209; list K-224

A low-denier polypropylene fiber is offered in both staple and filament forms and in various filament sizes from 3 to 22 deniers.

Reeves Bros., Inc., 1071 Ave. of the Americas, New York 18, N. Y.

Do you want more data? Write supplier or use card on page 209; list K-225

The cellulosic fiber Zantrel (called Z-54 in Europe, where it bears French and Belgian registration as a polynosic fiber) will be distributed in the United States under license from the Swiss firm of Societe Chimiotex. The staple, in the wet state, has high strength, low breaking elongation, high modulus, high elastic recovery, and a relatively low degree of water absorption. With a luster quite similar to that of silk, the fiber dyes well and gives a lofty, crisp hand.

Hartford Fibres Co., Div. of Bigelow-Sanford Carpet Co., Inc., 140 Madison Ave., New York 16, N. Y.

Do you want more data? Write supplier or use card on page 209; list K-226

138" ten-bar knitter offers speeds up to 480 rpm

Wider knitted pile fabrics and curtain and bedspread goods may be produced at higher speeds with a flat type knitting machine recently announced.

Equipped with 10 weft bars to provide great variety of fabric design, the machine is 138" wide and runs at

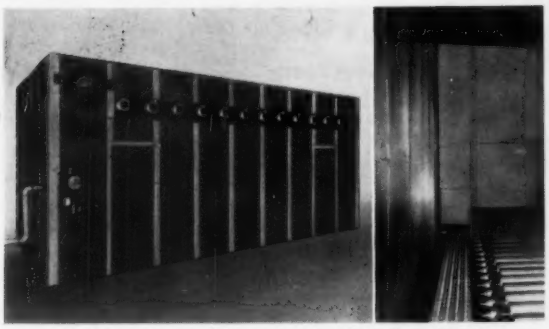
speeds up to 480 rpm. Standard gauge is 10 needles per inch; others are available.

Among other construction features are: electric stop motion; antifriction bearing equipped; interchangeable hardened sectional needle bed gauge; minimum vibration; and smooth operation.

Cidega Machine Mfg. Co., Inc., River Edge, N. J.

Do you want more data? Write ◂ or use card on page 209; list K-109

High speed, roll type resin curing units



Interior view at right shows catwalk at floor level.

A roll-type resin curing machine is operating in a finishing range at 60 to 65 yards per minute. Containing 79 four-inch stainless-steel rolls with 72" faces, it receives tenter-dried fabric, cures the resins involved, and delivers the goods to a rotary cutter-winder. Using centrifugal blowers to discharge heated air into a plenum chamber, it utilizes adjustable air orifices above each roll to maintain even temperatures at those points. It subjects the cloth to uniform tension at all times.

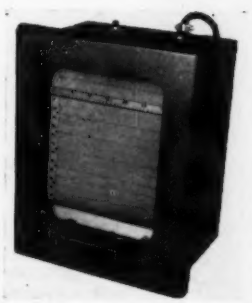
A catwalk at floor level on the inside provides complete accessibility for threading up, adjusting, and cleaning.

Roll size and number are determined by the particular application.

Adams-Zeller Corp., Glenside, Pa.

Do you want more data? Write ◂ or use card on page 209; list K-110

Chart frame idle or running time



A recording instrument traces a line on a 6-inch chart to reflect the downtime of slubbers, spinning frames, looms, knitting machine, etc. Up to 30 machines may be monitored by a single unit. An accessory permits up to five buttons to be pressed to explain the downtime — for instance, broken end, broken needle, maintenance, personnel, and miscellaneous—and to record the explanation on the chart. This permits the Watchman to be mounted on an office wall where supervision can glance at it to tell what machines are down and for what purpose.

Fabrionics Corp., Box 521, Huntington, N. Y.

Do you want more data? Write ◂ or use card on page 209; list K-111

A HIGH SPEED TWISTER SPINDLE

by Zinser

FOR SPEEDS UP TO 15000 RPM AND PACKAGE WEIGHTS TO 15 POUNDS

EQUIPPED WITH GENUINE SKF - HF & HZ ROLLER BEARING INSERTS.

SWEDISH STEEL CHROME PLATED BLADE

CHROME PLATED STEEL WHORL

INTERNAL EXPANSION KNEE BRAKE OR FINGER BRAKE

STEEL BASE WITH RUST RESISTANT FINISH

For all Twisting Applications, including: Draw-Twisters, Ply and Cable Twisters, and Up-Twisters. Many thousands are running perfectly in mills in the United States.

TOP DRIVE FILLING SPINDLES — WARP SPINDLES — PAPER PACKAGE WOOLEN SPINDLES —

ALSO MADE BY Zinser

CALL OR WRITE ONE OF OUR REPRESENTATIVES

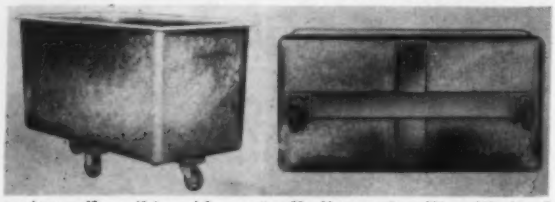
TEXTILE SUPPLIES W D USED MACHINERY

Watson & Desmond

P.O. BOX 1954 · CHARLOTTE, NORTH CAROLINA

Equipment briefs

A light-weight box truck, made of chrome-impregnated glass fiber, is designed for economical handling in textile plants, warehouses, etc. Lighter than aluminum, practically indestructible, it is impervious to steam,



water, oil, mild acids and alkalis, and will withstand temperatures from —40 F to 212 F (up to 250 F for short exposures).

Nutting Truck and Caster Co., 1201 West Division St., Faribault, Minn.

Do you want more data? Write supplier or use card on page 209; list K-201

An overseamer for woven materials that fray easily (such as bed spreads, towels, etc.) will do flat overedging or turned-edge seaming. Called Style 39500 V, the machine (maximum rated speed: 5500 rpm) is prepared in standard units to produce three-thread Type 504 stitch, but it can be special ordered at no extra cost to produce two- or three-thread plain or square-edge type stitches.

Union Special Machine Co., 400 N. Franklin St., Chicago 10, Ill.

Do you want more data? Write supplier or use card on page 209; list K-202

V-belts may be made to length on the job by using rolled belting of the proper size and fasteners to secure the cut ends. The supplies may be obtained in kits or in bulk and are secured by measuring around the pulley diameters and sending the information with the order. Advantages are obvious in reduced inventories and the ease in which belts may be threaded through closed places.

Flexible Steel Lacing Co., 4607 Lexington St., Chicago 44, Ill.

Do you want more data? Write supplier or use card on page 209; list K-203

A succession of pressure blowers equipped with airfoil blading move from 8000 to 64,000 cfm at pressures from ¾" to 2¼" psig. Called the Series 2400, the blowers are well suited for pressure or vacuum drying and other industrial applications, being designed to deliver optimum air with minimum input.

Westinghouse Sturtevant Div., Dept. T-257, 200 Readville St., Hyde Park, Boston 36, Mass.

Do you want more data? Write supplier or use card on page 209; list K-204

An antifriction cone-belt guide is available for a variety of guiding duties and is especially recommended for picker and fly frame use. It can be used at the highest belt speeds and will run 20,000 hours on one lubrication. Lack of friction in the shipper or guide rollers greatly increases belt life, since belt edges are not subject to fork scrubbing action.

SKF Industries, Inc., Front St. & Erie Ave., Philadelphia 32, Pa.

Do you want more data? Write supplier or use card on page 209; list K-205

A heavy duty flat steel strapping cutter (Model 550)

90 YEARS of making the "VERYBEST" LOOM NECESSITIES

JACOBS SINCE 1869

THE BULLARD CLARK COMPANY

JACOBS

SOUTHERN DIVISION Charlotte, N. C.

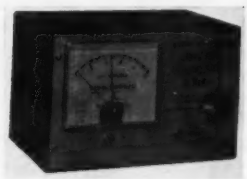
NORTHERN DIVISION Danielson, Conn.

is for use as part of strapping operations as well as for removing straps from inbound shipments. It will cut strapping up to 2" x 0.050" quickly, easily, and safely, and its use can speed production and reduce operative fatigue. Important features include a toggle arrangement that assures smooth over-all cutting action, cutting blade angle that resists dulling, an I-beam handle that gives strength with little weight, and a jaw angle designed to give maximum cutting power with minimum effort.

A. J. Gerrard and Co., 1950 Hawthorne Ave., Melrose Park, Ill.

Do you want more data? Write supplier or use card on page 209; list K-206

A conveyor overload-safety control is so responsive that one man can stop the conveyor by pulling on a trolley hanger, if such a sensitive adjustment is desired. The Tipp-Tronic control can be used on any type of conveyor with electric motor drive and exercises its control by monitoring the current drawn by the motor. Advantages include improved personnel safety and protection against under-lubrication, general overload, and accidental jamming.



Conveyor Div., The American MonoRail Co., Fourth and Franklin Sts., Tipp City, Ohio.

Do you want more data? Write supplier or use card on page 209; list K-207

A line of integral horsepower a-c motors is available in sizes from 1 through 250 horsepower in protected (open), weatherproof, totally enclosed, corrosion-proof, and explosion-proof enclosures. The Duty Master motors include all standard speeds and enclosures, and the designs include polyphase, ball bearing, vertical, and horizontal mounting arrangements with feet or footless, with NEMA C-face, D-flange, or P-base brackets. A principle feature is a low-inertia, fast accelerating rotor.

Reliance Electric and Engineeering Co., 24701 Euclid Ave., Cleveland 17, Ohio.

Do you want more data? Write supplier or use card on page 209; list K-208

The in-stream flow transmitter called Cronoflo, Model CTF-S, eliminates stilling wells and expensive maintenance in water, sewage, and industrial waste applications. Made for installation on Parshall flumes, weirs, and other head-area devices for the accurate measuring of rates of flow in open channels, the transmitter is in-stream actuated and utilizes a float motion riding directly in the channel.

B-I-F Industries, 345 Harris Ave., Providence 1, R. I.

Do you want more data? Write supplier or use card on page 209; list K-209

Ultrasonic measurement of liquid levels is performed precisely and continuously by a Metasonic instrument that uses solid metal acoustic wave guides to derive its information, essentially ignoring or cancelling the effects of the liquid and its properties on the accuracy of level measurement. It can be used in liquid temperatures from far below zero to molten metals, and its output is adaptable to recording and control, proportioning and blending.

General Ultrasonics, 6 Tobey Rd., Bloomfield, Conn.

Do you want more data? Write supplier or use card on page 209; list K-210

A complete array of aluminum fittings for schedules 10 and 40 pipe is available. With the fittings, joints may be butt welded or socket welded with aligning connectors. Either serrated flanges or unions may be used

Full Speed...even on 2" pipe or conduit

This new 300 is clear out of its price class! Its RIDGID-built motor has extra power and extra-long brush life . . . heavy-duty bump-proof switch . . . RIDGID Speed Chuck with guaranteed tight grip, forward, reverse, replaceable jaw inserts and all-metal hand wheel ...2 extra-strong tool support bars . . . and a lot of other features that make it far the most for your money. You can't afford to be without it—see and try the new 300 at your Supply House!

The Ridge Tool Company Elyria, Ohio, U.S.A.

THREADED PIPE...It's Tight...It's Best...Costs Less!

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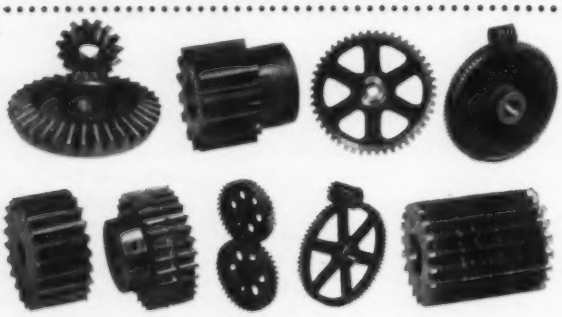
H.J. THEILER CORPORATION
SPARTANBURG, S.C.

BENNINGER WARPER

The most modern warper built today — greatest flexibility — high speeds — Automatic Computor — Transportable Drum — Slash Directly From Drum — or Beam onto Loom Beam — 1:1 End Leases and Split Leases up to 10-Fold — Results: No Yarn waste, better quality warps, no slasher standstill.

QUICK RETURN OF THE INVESTMENT!

GEARS TO YOUR SPECIFICATIONS BY
FERGUSON



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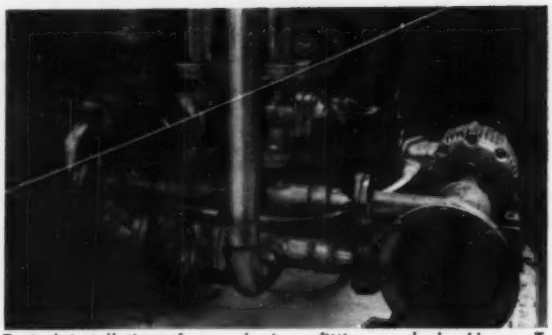


Typical installation of new aluminum fittings made by Horace T. Potts Co.

where demountable joints are required. Serrations on the inside diameter of both the union ferrule and the flange allow either pipe or fitting to be expanded directly into the union or flange, insuring a tight leak-proof joint without welding. Other fittings include tees, crosses, 45° and 90° elbows, caps, eccentric and concentric reducers, and stub ends.

Speedline Div., Horace T. Potts Co., Erie Ave. and D St., Philadelphia 34, Pa.

Do you want more data? Write supplier or use card on page 209; list K-211

A one-piece, collapsible box is designed to provide a large-capacity container, easily handled by fork lift, that can be collapsed into only six inches of its original height. A specially designed stacking foot permits fork lifts to handle the Kennett collapsible boxes, singly or stacked, from all four sides. Lids, either one or two piece, are supplied and are hinged in place. The entire box will collapse without any of the parts becoming separated or lost. Sides, ends, and bottom are made of Vulcaneer fibre-armored plywood, and box and lid edges are reinforced with metal moldings.

National Vulcanized Fibre Co., 1059 Beech St., Wilmington, Del.

Do you want more data? Write supplier or use card on page 209; list K-212

A water cooler made to rest on the floor, fit snugly against the wall facing (it is called the Wall-Tite), and to be easily installed, is available in 6-, 11-, or 16-gallon capacities. The cabinet is only 15¾" wide, extends 13" from the finished wall, and stands 40" high.

The Halsey W. Taylor Co., Warren, Ohio.

Do you want more data? Write supplier or use card on page 209; list K-213

Two knitwear seaming machines for light to heavy knit materials offer improvements in seam appearance and quality. The Style 39000Y is recommended for light- to medium-weight cotton, wool, or synthetics knit goods (bathing suits, jackets, etc., and other knit garments) and is designed to accommodate stretchy, loosely knit materials.

The Style 395000 AA, designed to handle bulky knit materials (sweaters, jackets, etc.), may be used for plain seaming or for seaming and simultaneously inserting a reinforcing tape as in shoulder seams of sweaters. Both machines have a rated speed of 5500 rpm.

Union Special Machine Co., 400 N. Franklin St., Chicago 10, Ill.

Do you want more data? Write supplier or use card on page 209; list K-214

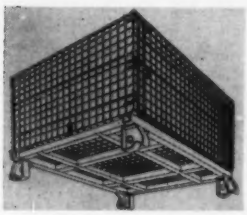
Variable-pitch pulleys automatically adjust pitch diameters, through the action of a spring-tensioned sliding flange, to hold belts firmly at all times. Speed variation is accomplished by varying the center distance between

the two pulleys—as the distance shortens, the variable-pitch pulley automatically takes up belt slack by expanding its pitch diameter. It likewise compensates for lengthening distances. The pulleys are designed to work with A or B belts within ⅛- to 2-hp range.

Maurey Mfg. Corp., Service Div., 2907 S. Wabash Ave., Chicago 16, Ill.

Do you want more data? Write supplier or use card on page 209; list K-215

Self-cleaning, collapsible cargo containers that lend themselves to stacking are made of welded wire. The base sections are designed to accommodate the minimum 30" length of lift truck forks and to afford four-way, even eight-way, entry. Capacities of the Clearview Cargo-tainer range from 500 to 6000 pounds.



Tri-State Engineering Co., Washington, Pa.

Do you want more data? Write supplier or use card on page 209; list K-216

Electric hoists in 12 models range in capacities from 0.5 to 3.0 tons, and in speeds from 9 to 36 fpm, and are equipped with push-button control as well as pendent control. Called Quik-Lift hoists, they can be supplied with either hook or multipurpose lug suspension, and are equipped with easily accessible brakes that can be operated manually if power fails. Motors are dual voltage.

Coffing Hoist Div., Duff-Norton Co., Danville, Ill.

Do you want more data? Write supplier or use card on page 209; list K-217

An automatic, heavy duty steel strapping dispenser eliminates costly guesswork, saves time, reduces waste, and is fully adjustable to accommodate ¾", 1¼", or 2" flat steel strapping in ribbon wound coils. It (the Model #440) responds to a dial setting to cut straps in the length and number desired. Both air (60 to 90 psi) and electric models (110 volts) are offered.

A. J. Gerrard and Co., 1950 Hawthorne Ave., Melrose Park, Ill.

Do you want more data? Write supplier or use card on page 209; list K-218

A side shift load grab with multipurpose arms handles unit loads of drums, cartons, crates, bales, rolls, etc. Mounted on the Model J SpaceMaster, it will handle almost any type of nonpalletized load. Arm gripping surface is either smooth or rough-top rubber bonded to steel sheets that are screwed to the plates—other surface types are available. Side shift off center is 4".

Lewis-Shepard Products, Inc., Dept. R9-10, 125 Walnut St., Watertown 72, Mass.

Do you want more data? Write supplier or use card on page 209; list K-219

A kit of ideas for planning graphic visual controls contains numerous suggestions for picturing facts graphically in any step-by-step or period-by-period sequence. Such subjects as production, inventory, maintenance, sales, etc., are covered. A brochure entitled "How to Plan" contains 25 tested ideas illustrated with suggested applications; a 24-page booklet, "Graphic Visual Control,"

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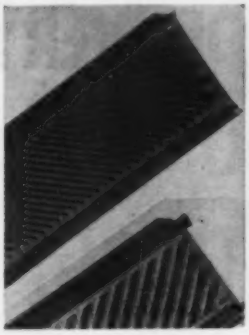
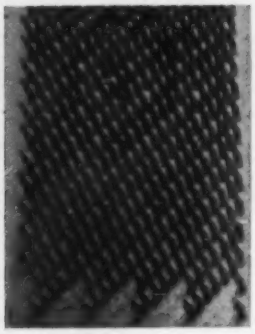


The licker-in like wire is twill-set into the foundation fabric as shown at the bottom of this photo.



Note the shape of the teeth in this close-up photo. Wire runs for years without grinding.

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serves as manual and catalog. Over 100 illustrations, some printed in 6 colors, are used to help explain the system and to picture some typical uses.

Graphic Systems, 55 West 42nd St., New York, N. Y.

Do you want more data? Write supplier or use card on page 209; list K-220

Accessories make a pipe and bolt threading machine of the Ridgid 300 power drive. They include a carriage (No. 310) that slips on the support arm to hold the power die head and cutter (it will thread close nipples with the No. 19 nipple chuck); a full-floating, wheel-type cutter (No. 360) to make straight cuts at pipe machine speeds; and any 500 series quick-opening dies for pipe or bolt work. A single, fine-adjustment screw on the carriage aligns each die head for true threads.

The Ridge Tool Co., Elyria, Ohio.

Do you want more data? Write supplier or use card on page 209; list K-221

A low-cost, multipurpose ultrasonic cleaning unit can handle two different jobs at the same time in small parts cleaning, laboratory processing, and investigation of various ultrasonic phenomena. Called the Series 400 SonBlaster, it will ultrasonically agitate the contents of two 400 ml beakers, and, using two different solutions at the same time, wash and rinse parts simultaneously. It will operate with any chemical, acid, or alkali solvent in glass beakers, or with its stainless-steel tank without beakers.

The Narda Ultrasonics Corp., 625 Main St., Westbury, L. I., N. Y.

Do you want more data? Write supplier or use card on page 209; list K-222

Highly efficient industrial machine mounts eliminate the need to lag down production machinery. The Model L kinetic mounts have an outstanding isolation efficiency with high internal damping for control of vibration and shock through the use of specially processed high density molded materials. They have built-in level control features and are available in three standard sizes to handle load ranges to 8000 pounds each.

Consolidated Kinetics Corp., 1065 Dublin Rd., Columbus 8, Ohio.

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New books

A report of successful company practices, *Cost Reduction at Work*, carries explanations of how some companies have substantially reduced their manufacturing costs—included are case studies of successful cost reduction. Among the areas reported are approaches to cost reduction through work simplification, how the purchasing function can contribute to cutting costs, and packaging cost reduction. Copies available from American Management Association, 1515 Broadway, Times Square, New York 36, N. Y. Price: $2.25 (members $1.50).

Forty standards, 11 of which are new, revised, or have had status changes, are contained in *Compilation of ASTM Standards on Soaps and Other Detergents (D-12)*. Typical of the material covered are specifications for soaps (bar, chipped, powdered), alkaline detergents, and methods of tests for detergents and soaps, as well as definitions. Copies may be obtained from American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. Price: $3.50.

Management for the Smaller Company is a reference

book created by American Management Association specifically for companies with fewer than 1000 employees. Based on the knowledge and experience of executives and specialists who have actually solved small-company problems, this publication shows how good management can help the smaller company to increase its profits and improve its competitive position. Copies available from the American Management Association, 1515 Broadway, Times Square, New York 36, N. Y. Price: $9.00 (members $6.00)

Scientific Management of Marketing Operations charts the most advanced thinking and practices for combining modern marketing with profitable scientific management throughout the organization. It is based on the theme that the modern marketing concept (a change in emphasis for a firm from selling what it makes to making what will sell) requires greatly improved skills of market analysis, creativity, and demand creation on the one hand, and company-wide application of the most profitable use of scientific management on the other. Copies available from Society for Advancement of Management, 74 Fifth Ave., New York 11, N. Y. Price: $1.50.

The tenth volume in the annual series, *Techniques of Plant Maintenance & Engineering*, contains all the papers read at the 1959 Plant Maintenance & Engineering Conference held in Cleveland, Ohio, in January, 1959. Included are answers to 1056 questions submitted by engineers attending the conference, and more than 70 charts are reproduced. Copies are available from Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y. Price: $10.00.

Dictionary of Textiles contains 12,000 definitions covering all fibers, fabrics, and finishes as well as all uses of fabrics—clothing and accessories, decorative materials, linens and domestics, rugs and blankets. Current terminology and complete descriptions of fabrics—both natural and man-made, domestic and foreign—are given. In many places where comparable fabrics have been given different names in various countries, these have been reconciled. Wherever possible, botanical names of textile fibers have been included so that comparisons might be made of fibers seemingly different because of local or native terms. Copies may be obtained from Fairchild Publications, Inc., 7 East 12 St., New York 3, N. Y. Price: $25.00.

The Textile Arts combines in one definitive volume a handbook on fabric structure and design processes with the story of textiles as a part of our cultural heritage. It considers all phases of fabric formation and decoration with special emphasis on the hand arts and skills. There are step-by-step design instructions for the beginner, a discussion of looms and their uses for the weaver, a chapter devoted to structural processes other than weaving, and chapters on needlework, embroidery, dyes and dyeing processes, painting, printing, and stamping processes. Copies are available from Harper & Bros., 49 East 33rd St., New York 16, N. Y. Price: $12.50.

Condensed and authoritative information on all classes of textile fibers, both natural and man-made, is included in *Handbook of Textile Fibres*. It treats in detail fiber sources, historical and economic backgrounds and the forms and sizes in which they are available; production and processing with special attention paid to dyeing; structure and properties; and fiber behavior in use (wearing properties, laundering, ironing, etc.) Copies may be obtained from Merrow Publishing Co., Ltd., 276 Hempstead Rd., Watford, Herts., England. Price: about $2.10.

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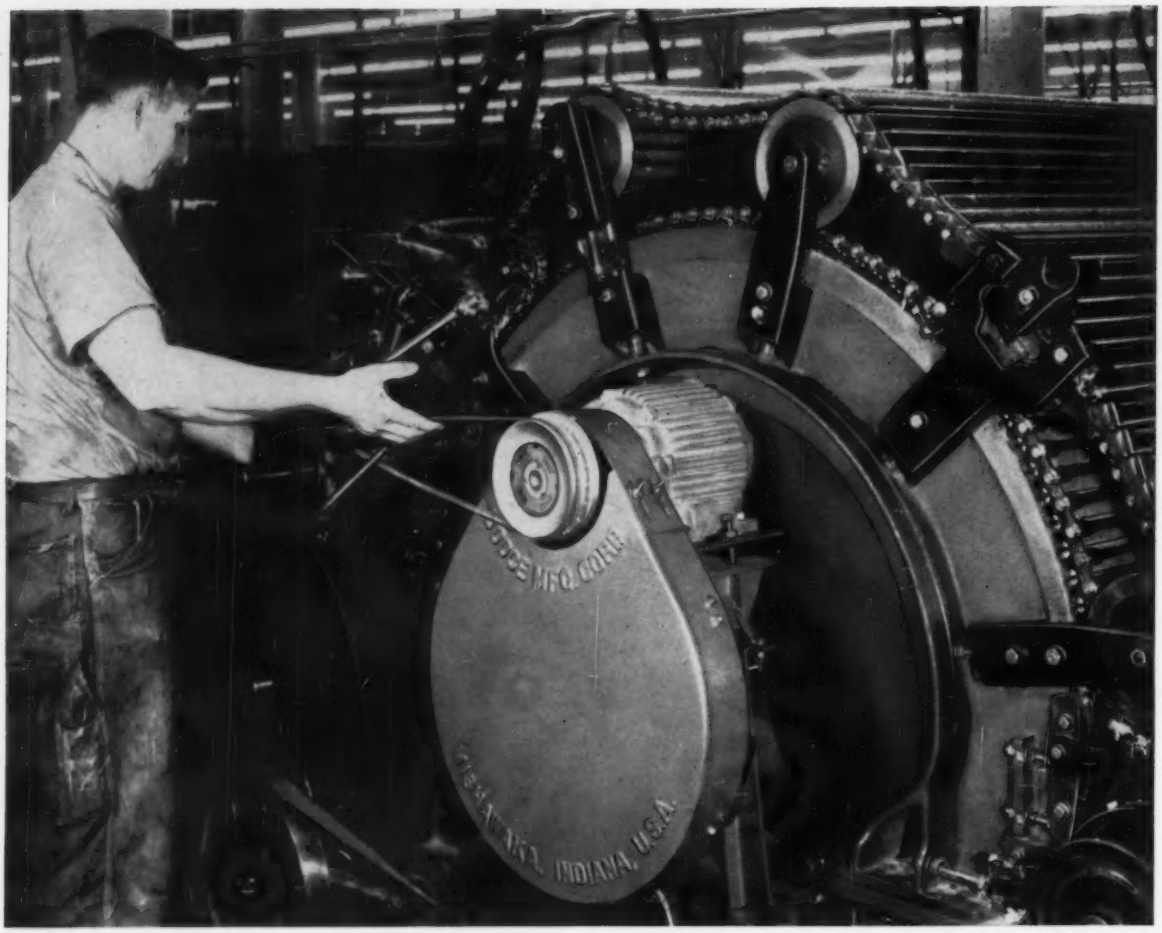

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For further information use Handy Return Card, Page 209

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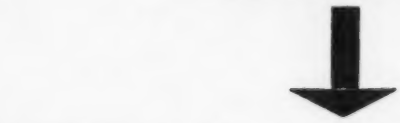

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FREE BOOKLETS

10-1 IMPROVEMENTS IN SLASHING. Data sheet describes recent improvement in slashing technique and equipment. The Hubinger Company, 601 Main St., Keokuk, Iowa.

10-2 WORKING DOLLARS. Brochure tells how working dollars obtained through commercial financing give a company flexibility, continuity, and economic comfort. Walter E. Heller & Co., 105 West Adams St., Chicago 90, Ill.

10-3 AUTOMATIC BOILERS. Bulletin describes and illustrates gas, oil, and combination gas-oil models, new boilers, etc. Orr & Sembower, Inc., Reading, Pa.

10-4 LIQUID METERS. Catalog provides simplified basis of selecting a volumetric meter for any given application. Buffalo Meter Company, Inc., 2896 Main St., Buffalo 14, N. Y.

10-5 COMPRESSED AIR. Literature is designed to help anyone in the selection of small packaged air compressor for industrial application. Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

10-6 PNEUMATIC FORK TRUCKS. Brochure describes gas powered pneumatic tired truck of 2000 lbs. capacity. Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.

10-7 HEAT RECLAIMERS. Inquiry sheet contains all necessary information areas requiring specific data on heat reclaimer design and estimated cost. The Patterson and Kelly Co., East Stroudsburg, Pa.

10-8 GLASTEEL TANKS. Brochure describes glass inside, steel outside tank for storing corrosive or sticky products, or for those which cannot tolerate contamination. The Pfaudler Co., Rochester 3, New York.

10-9 FLEXIBLE COUPLING. Expanded line of flexible cushion couplings ranging from fractional to 190 hp are described in new bulletin. Bulletin A669C, Dodge Manufacturing Corp., 3500 Union St., Mishawaka, Indiana.

10-10 TRUCKS FOR TEXTILES. Brochure describes fork trucks and fork truck attachments designed particularly for cotton and textile handling. Actual mill photographs included. Clark Equipment Company, Industrial Truck Div., Battle Creek, Mich.

10-11 SMALL BASIC SWITCHES. Catalog covers four important switch groups including subminiature switches and sub-subminiature switches. Micro-Switch Division, Minneapolis-Honeywell Regulator Co., Freeport, Illinois.

10-12 ADJUSTABLE SPEED FOR LOW HP. Booklet gives detailed preformance and application data on the complete line of all-electric adjustable drives. Bulletin D-2507, Reliance Electric & Engineering Company, 24701 Euclid Avenue, Cleveland 17, Ohio.

10-13 VARIABLE SPEED DRIVES. 96 page catalog describes wide assortment of styles, modifications and accessories available in complete line of variable-speed motodrives. Write on company letterhead to Reeves Pulley Division, Reliance Electric & Engineering Company, Columbus, Indiana.

10-14 "ACELE" STORAGE AND SHIPPING. Brochure describes handling equipment and procedures for storage and shipping racks of "Acele" Acetate Tricot Beams. DuPont Textile Fibers Dept. Wilmington, Del.

10-15 MECHANICAL DRIVES. Bulletin 3600 describes the Allispede mechanical adjustable speed drive. Includes engineering and application data. Louis Allis Company, 427 E. Stewart St., Milwaukee 1, Wisconsin.

10-16 PIN DRAFTER. Textile job report No. 24 describes pin drafter installation at Wellman Combing Company in Johnsonville, South Carolina. Warner & Swasey Company, 5701 Carnegie Avenue, Cleveland, Ohio.

10-17 PROCION DYESTUFFS. Bulletin lists the present line of Procion dyestuffs, including new members which have increased the range to 26. These will cover nearly every part of the spectrum. Arnold, Hoffman Co., Inc. 55 Canal St., Providence, R. I.

10-18 NEW VAT DYESTUFF. Circular deals with the properties and applications of Indanthrene Corinth B Infra Paste for use on cellulosic textiles. General Dyestuff Company, 435 Hudson St., New York 14, N. Y.

10-19 DYEING ARNEL-COTTON. Report gives methods of solving problems involved in dyeing Arnel-cotton blends. Sandoz, Inc. 61 Van Dam St., New York 13, New York.

10-20 FORK LIFTS. Booklet describes increased operating efficiency, greater driver comfort and improved handling ease of "Stream-Liner" Series. Towmotor Corporation, 1226 East 152nd St., Cleveland 10, Ohio.

BOOKLETS

raw stock to roving

T-101 LUMMUS PEPPER - SHAKER OPENER. Gives complete details and protographs. Aldrich Machine Works, P. O. Box 750, Atlanta, Ga.

T-102 STATIC ELIMINATION. How to eliminate static safely and inexpensively. Simco Co., 920 Walnut St., Lansdale, Pa.

T-103 CARD GRINDING INFORMATION. Care and operation of cards. B. S. Roy & Son Co., Worcester, Mass.

T-104 CARD CLOTHING. Describes Strip-O-Matic Card Clothing. Benjamin Booth Co., Allegheny Ave. & Janney St., Philadelphia, Pa.

T-105 VERSA - MATIC DRAWING FRAME. Describes drafting elements, quality of sliver, roving and yarn possible. Saco-Lowell Shops, 60 Batterymarch St., Boston, Mass.

T-106 SARGENT OPENER. Describes opener with rotary evener and stripper. C. G. Sargent's Sons Corp., Graniteville, Mass.

T-107 FEATHERTOUCH DRAFTING. How to get "highest production per frame at lowest cost." Ideal Industries, Inc., Bessemer City, N. C.

T-110 BOBBINS. Catalog describes metal, wood and plastic bobbins. Illustrations show actual use. Lestershire Spool Div., National Vulcanized Fibre Co., Wilmington, Del.

T-111 MAGNETIC IDEAS. Booklet shows uses of permanent magnetic separation equipment in opening room as well as throughout mill. Removes tramp iron, prevents fires. Eriez Mfg. Co., Erie, Pa.

T-112 ADVANTAGES OF ALDRICH PICKERS. Good technical text, comprehensive pictures. Aldrich Machine Works, P. O. Box 750, Atlanta, Ga.

T-113 NEW CONDENSER TAPE. Describes Supr-O-Tape, an impregnated fabric condenser tape. Benjamin Booth Co., Allegheny Ave. & Janney St., Philadelphia 34, Pa.

T-119 FIBER METER. Automatic weighing and blending assures quality, holds variation to 1%. James Hunter, Inc., P. O. Box 298, Mauldin, S. C.

T-120 PIN DRAFTERS. Textile job report No. 21 tells how Warner & Swasey Pin Drafters help modify jute systems for carpet yarns. Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio.

T-121 UNIVERSAL CARD COILER. Literature describes both head and base swivel for adjustment. Includes data on 90-day free trial. McDonough Power Equipment, Inc., McDonough, Ga.

T-122 RECONDITION OPENING & CLEANING. Bulletin gives whys and wherefores of reconditioning your opening and cleaning lines. Special attention given to each machine with suggestions as to parts replacement. Saco-Lowell Shops, 60 Batterymarch St., Boston 10, Mass.

T-123 COILER CONVERSIONS. Full facts on low initial cost conversion to larger coiler cans. Lists advantages, has complete description. Southern States Equipment Corp., Hampton, Ga.

T-124 CARD DRIVE. Bulletin 301-a describes simple, safe, efficient individual card drive. Southern States Equipment Corp., Hampton, Ga.

T-132 PROCTOR SUPER PICKER. Data sheet gives details of the Proctor Super Picker for use on slabs of baled cotton, or wool and synthetic blends in layers up to 12" thick. Proctor & Schwartz, Inc., 7th St. and Tabor Rd., Philadelphia 20, Pa.

T-133 ANTI-STATIC AGENT. Data sheet lists basic characteristics of liquid anti-static agent which eliminates processing difficulties with fibers due to static electricity. E. F. Houghton & Co., 303 West Lehigh Ave., Philadelphia 33, Pa.

yarn and warp making

T-201 PRODUCTS FOR SPINNING AND WEAVING. Complete line, applications, advantages shown. Dayton Rubber Co., Textile Div., Dayton, Ohio.

T-202 NEW BOBBIN MANUAL. Complete bobbin guide. Lestershire Spool Division, National Vulcanized Fibre Co., Wilmington 99, Delaware.

T-203 SPINDLE OIL. "Gulfspin" insures against excessive wear and eliminates spindle wobble. Gulf Oil Corp., Gulf Bldg., Pittsburgh, Pa.

T-205 HIGH SPEED AUTOMATIC QUILLER. Lists advantages and dimensions of "Autocopser." Terrell Machine Co., Inc., P. O. Box 928, Charlotte, N. C.

T-208 PACKAGED SPINNING MODERNIZATION. Details on Collecto-Vac, Open-Aire Creels, Cross-Jet Cleaner, Air Conditioning. Bahnson Company, Winston-Salem, N. C.

T-209 SECTIONAL WARPER. Describes full width and sectional warpers for knitting, weaving. Robert Reiner, Inc., Weehawken, New Jersey.

T-210 CONICAL RINGS AND FLYERS. Complete details and specifications. Herr Manufacturing Co., Inc., 318 Franklin St., Buffalo 2, New York.

T-211 PRECISE WINDING MACHINE. For winding pineapple or straight cones and tubes of synthetics. Foster Machine Co., Westfield, Mass.

T-212 AUTOMATIC CLEANING EQUIPMENT. Working details and advantages of the Tri-Rail Cleaner. American MonoRail Co., 111 East 200th St., Cleveland 17, Ohio.

T-216 SPINNING FRAME CONVERSIONS. Big-package, new-frame results at half the cost. Meadows Mfg. Co., P. O. Box 10876, Station A, Atlanta, Ga.

T-217 COLLECTO-VAC. New development collects lint, fly and broken ends. The Bahnson Company, Winston-Salem, N. C.

T-219 SPINNING AND TWISTER RINGS. Complete details, pictures, price list. Whitinsville Spinning Ring Co., Whitinsville, Mass.

T-222 SUCTION CLEANING SYSTEM. Details on new Collector Unit Model C-4. Pneumafil Corp., Charlotte 8, N. C.

T-223 FACTS ABOUT YOUR FLYERS AND SPINDLES. Advantages of smooth flyer and spindle operation. Ideal Machine Shops, Bessemer City, N. C.

T-225 LAPLESS ENDLESS SPINNER. Full information available. Ton-Tex Corporation, 31 Columbus Ave., Englewood, N. J.

T-226 WORSTED SPINNING. Describes five stages from top to yarn. Saco-Lowell Shops, 60 Batterymarch St., Boston 10, Mass.

T-227 SPINDLE OILING MACHINE. Features and advantages noted. Wicaco Machine Corp., 4800 Stenton Ave., Wayne Junction, Philadelphia 44, Pa.

T-228 HANDY SPINNING REFERENCE. Shows traveler speeds, sizes of ring flanges. Victor Ring Traveler Co., Providence, R. I., and Gastonia, N. C.

T-229 UNIRAIL UPTWISTER. Higher yarn quality and better packages at faster speeds. Universal Winding Co., P. O. Box 1605, Providence, R. I.

T-230 PRECISION TEXTILE WINDING. Tensions and density control for winding rubber cones. Kidde Textile Machinery Corp., Farrand St., Bloomfield, N. J.

T-231 CONE WINDER. Describes Model 102 winder, including applications. Foster Machine Co., Westfield, Mass.

T-232 SHORT CUT TO STAPLE FIBER SPINNING. Ten steps in operation of the Tow Stapler. Turbo Machine Co., Lansdale, Pa.

T-233 WEAVER'S KNOTTER. Instructions as to use, description. A. B. Carter, Inc., Gastonia, N. C.

T-234 TEXTILE ROLL COVERINGS. Describes complete line as well as other mill supplies. Armstrong Cork Co., Industrial Div., Lancaster, Pa.

T-239 LARGE PACKAGE TWISTER. Information on new anti-friction Jumbo Twister which carries a 14" bobbin with a 12" build. Meadows Mfg. Co., P. O. Box 10876, Sta. A, Atlanta, Ga.

T-241 PACEMAKER TWISTERS. Folder gives details on high production, outlines notable features. Whitin Machine Works, Whitinsville, Mass.

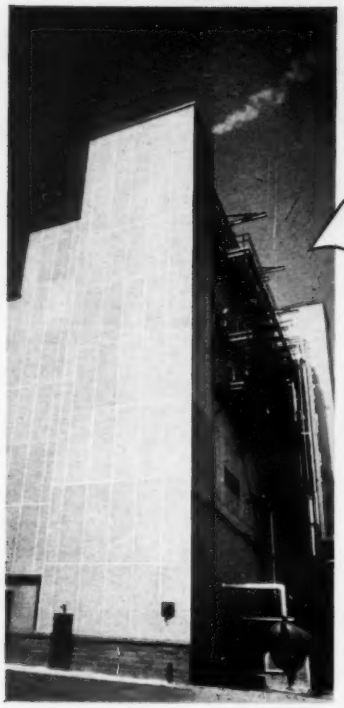
T-242 RING SPINNING FRAME. Folder presents description, illustrations and specifications of up-to-date Simplex ring spinning frames. Davis & Furber Machine Co., North Andover, Mass.

T-243 ANTI-FRICTION TWISTER BEARINGS. Find out how bearings helped make The Meadows Twister almost friction-free. Fafnir Bearing Company, New Britain, Conn.

T-246 BETTER BEAMS. Information on three ways to make better beams. Kidde Textile Machinery Corp., Farrand St., Bloomfield, N. J.

T-249 VARI-SPEED MOTOR PULLEY. Describes variable speed control through use of simplified three-major-part disc-assemblies with only one lubrication point. Reeves Pulley Co., Reliance Electric & Engineering Co., Columbus, Ind.

T-250 SPINNING MODERNIZATION Booklet shows how lower costs and improved quality are obtained by spinning modernization. Roberts Company, Sanford, N. C.



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BOOKLETS

T-255 NEW BOBBIN HOLDER. Details on streamlined, positive latching bobbin holder. Whitehead Die Casting Co., 1140 Zonolite Rd., Atlanta, Ga.

slashing—weaving—tufting

T-301 COUNTING AND MEASURING DEVICES. Wide range of counting devices for all types of textile machinery. Veeder-Root, Inc., Hartford, Conn.

T-302 LOOM SUPPLIES. Describes complete line. E. H. Jacobs Northern Division, The Bullard Clark Co., Danielson, Conn.

T-304 LOOM PRODUCTION CHARTS. Celluloid card shows yards per loom per week. Ralph E. Loper Co., Greenville, S. C.

T-306 THE STORY OF STARCHES. History and information on manufacture and use of starches. National Starch & Chemical Corp., 750 Third Ave., New York 17, N. Y.

T-308 STEEL WARP BEAMS. Beams for both broadloom and narrow fabrics. Milton Machine Works, Inc., Milton, Pa.

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T-358 LOOM SUPPLIES. Information on rod lubricant and applicator, sponge leather bunter, picker. Garland Mfg. Co., 54 Water St., Saco, Me.

T-360 SUPPLIES FOR TUFTERS. Information on yarns for rug tufting or chenille or carpet backing. Piedmont Cotton Mills, East Point, Ga.

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T-362 SIZE THAT SATISFIES. Information on getting the correct size package for your mill. Also on Bingham line of slasher rolls. Stodghill & Co., 716 Ponce de Leon Place, Atlanta, Georgia.

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T-410 "READING" TYPE 60 F-F KNITTING MACHINE. Information about the new "Reading" Type 60, 38-section automatic full-fashioned hosiery knitting machine. Write Textile Machine Works, Reading, Pa.

wet processing

T-500 CLOTH GUIDES. Bulletin 22.1 provides application diagrams and illustrations. GPE Controls, Inc., 240 E Ontario St., Chicago 11, Ill.

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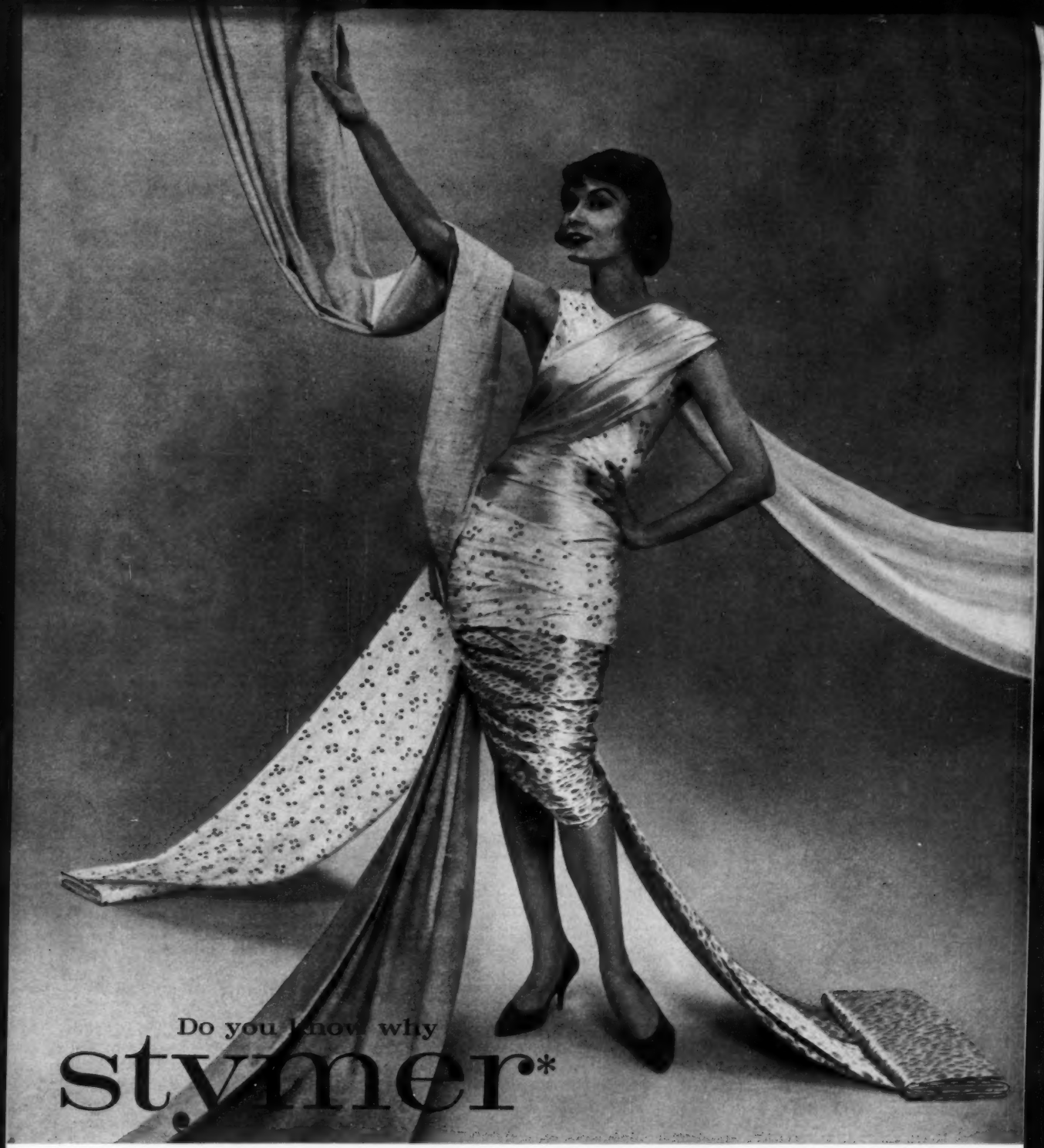

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T-548 HANDBOOK ON METHOCEL. Gives technical information and use data on family of methylecellulose ethers called Methocel. Organic Chemicals Sales, The Dow Chemical Co., Midland, Mich.

T-549 WALL CHARTS FOR HANDLING, TESTING H_2O_2. Two 16" x 21" wall charts available, one on handling and the other on testing H_2O_2. Becco Chemical Div., Food Machinery & Chemical Corp., Buffalo 7, N. Y.

T-550 POLYVINYL ACETATE EMULSION. Bulletin contains a description of Celanese emulsions and cites advantages of Celanese polyvinyl acetate emulsions in textile finishing. Celanese Corp. of America, Plastics Div., 744 Broad St., Newark 2, N. J.

T-554 INSTRUMENT CATALOG. Complete information on industrial instrument accessories and supplies. Includes specifications, parts numbers and prices. Catalog 500, Foxboro Co., Foxboro, Mass.

T-556 HUNTER DYEING EQUIPMENT. Describes fully with diagrams Hunter Model A Dye Becks, Hunter No/Lap Reels, Model S Dye Kettles, Open Width Dye Kettles, Sample Dye Kettles. James Hunter Machine Co., North Adams, Mass.

T-557 HIGH ACTIVITY CATALYST. Technical bulletin describes new catalyst AC-6 which provides increased activity, excellent bath life, minimum odor formation, etc. Monsanto Chemical Co., Plastics Div., Springfield, Mass.

T-558 CATIONIC DYE LEVELER. Bulletin TX-34 gives new information on dye leveler for acid colors on nylon tricot and wool through use of Nopco 1425-B. Nopco Chemical Co., Textile Chemicals Div., Harrison, N. J.

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fibers and yarns

T-601 FORTISAN-36, NEW TEXTILE FIBER. Includes charts, diagrams, text, presents technical properties. Textile Sales Dept., Celanese Corp. of America, P. O. Box 1414, Charlotte, N. C.

T-602 CAPROLAN NYLON HEAVY YARNS. Describes strength, long flex life and ready dyeability. Fiber Sales Dept., National Aniline Div., 261 Madison Ave., New York 16, N. Y.

T-603 RAYON—MILE BY MILE. Details on how rayon is produced mile by mile, perfect inch by inch. Industrial Rayon Corp., 500 Fifth Avenue, New York 18, N. Y.

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T-607 THE STORY ON LUREX. Information on metallic yarns made with Mylar and how they are developed to broaden the scope of the tufted industry. Textile Fibers Dept., The Dow Chemical Co., James River Div., Williamsburg, Va.

T-608 TASLAN TEXTURED YARNS. Technical information on dyeing and finishing of new fabrics made with Taslan. E. I. du Pont de Nemours & Co., Wilmington 98, Delaware.

T-609 PROCESSING NYLON STAPLE. Data sheet describes method of processing Du Pont 42 Nylon Staple in blends with cotton. Covers complete operation through sizing. Bulletin N-93, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

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T-701 TESTING INSTRUMENTS. Descriptions of 37 instruments for testing textiles. Custom Scientific Instruments, Inc., 541 Devon St., Kearny, N. J.

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T-705 STROBOTAC. Measures speed of rotating, reciprocating or other cyclic motions. General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.

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T-712 AUTOMATIC MOISTURE CONTROL. Booklet tells how Hunter Electro-Psychrometers are used in measuring percentage of moisture in all classes of textiles, whether yarns or fabrics. Hunter Controls, Inc., Div., James Hunter Machine Co., North Adams, Mass.

services for management

T-801 FACTORING SERVICE. Details on advantages of factoring, including information on general banking and pension plans. Trust Company of Georgia, Atlanta, Ga.

T-802 NON-WOVEN FABRICS. Report includes how non-woven fabrics are made, machinery involved, sample fabrics. Textile Fibers Dept., E. I. du-Pont de Nemours & Co., Inc., Wilmington 98, Del.

T-805 PROFIT THROUGH FACTORING. Brochure gives facts on the use of factoring as a modern plan for developing sound business growth and added profits. Walter E. Heller & Co., Dept. TI-2, 105 W. Adams St., Chicago 99, Ill.

T-807 GROUP INSURANCE. Information on how textile group insurance can insure the happiness of your employees and make for a better running mill. Provident Life and Accident Insurance Co., Group Dept., Chattanooga, Tenn.

T-808 FACTORING. Complete details on services offered as mill factors. L. F. Dommerich, 271 Madison Ave., New York, N. Y.

T-810 THE WONALANCET WAY is the title of an editorial booklet published five times a year dealing with current problems. Write Wonalancet Company, 128 Burke St., Nashua, N. H.

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T-818 TEXTILE ENGINEERING. Information on complete, integrated service covering every type of textile project. Robert & Co. Assoc., 98 Poplar St., N. W., Atlanta 3, Ga.

T-819 ORGANIZED LUBRICATION PAYS. Planning book entitled "Management Practices that Control Costs via Organized Lubrication" shows how to effect savings in five areas of plant operation. Available from Texaco, Inc., 135 E. 42nd St., New York 17, N. Y.

T-821 INVENTORY CONTROL. How a daily report of inventory condition mechanically produced on existing business machines showed a net direct payroll saving of more than 10,000 a year. Administrative Methods Dept., Werner Textile Consultants, 1430 Broadway, New York, N. Y.

plant operation

T-902 BELT LACING EQUIPMENT. Includes prices, specifications, etc. Clipper Belt Lacer Co., Grand Rapids, Michigan.

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T-921 CATALOG OF NEEDLE BEARINGS. Design, application for five types of needle bearings. The Torrington Co., Torrington, Conn.

T-924 BALL BEARINGS FOR TEXTILE MACHINERY. Bearings for all phases of textile processing. The Fafnir Bearing Co., New Britain, Conn.

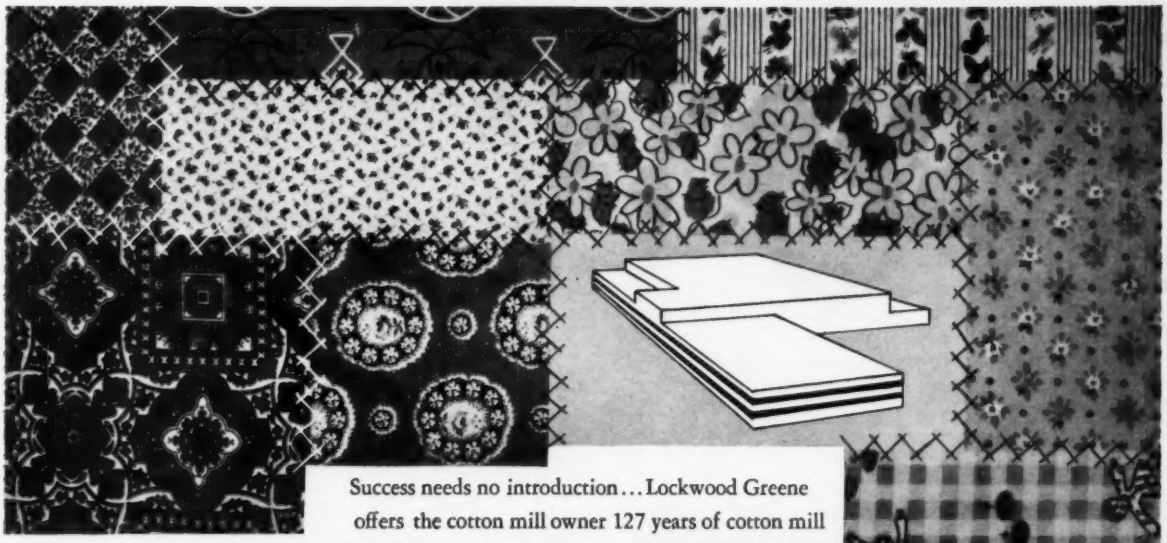
T-925 LUBRICATION OF BEARINGS. Helpful list of do's and don't to prolong bearing life. New York & New Jersey Lubricant Co., 292 Madison Ave., New York 17, New York.

T-931 NEW V-BELT DRIVES. Bulletin contains information on selection and operation of V-belt drives. Covers all types of V-belt drives. Dodge Mfg. Corp., Mishawaka, Ind.

T-932 SMOOTH ACCELERATION, DECELERATION. Describes eddy-current equipment for smooth, stepless acceleration and deceleration Eaton Mfg. Co., 3307 14th Ave., Kenosha, Wis.

T-933 CATECHISM OF ELECTRIC MACHINERY. Booklet contains complete technical treatise on various electrical machines. Electrical terms defined. Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Illinois

T-937 V-BELTS. Tells how raw materials and finished belts are tested and inspected. Quality control and experimental production covered. Booklet 5-51107, Dept. 794, Goodyear Tire & Rubber Co., Akron 16, Ohio.



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It is now possible for you to produce without modification of your present equipment wash 'n' wear fabrics of superior properties.

Why? Because there is a new fiber of super strength rayon available. It is AVRON rayon.

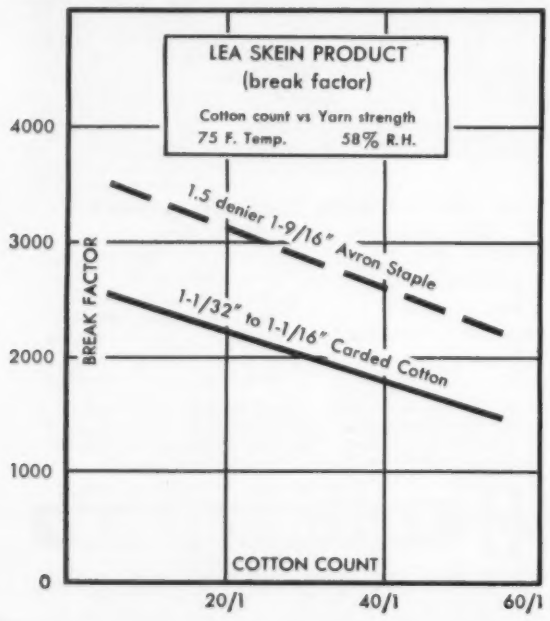
The new fiber excels cotton for single fiber tensile strength in the conditioned state, approximates it for the same property when wet. AVRON is not degraded to the same extent as cotton by resin finishing and, added to cotton, it imparts a soft hand unattainable with cotton alone.

NO CHANGE IN TECHNIQUES NECESSARY. Avron rayon may be worked through the cotton system without any modification of equipment. Because of superior tensile strength, spinning and weaving efficiency is higher for Avron rayon than for cotton. And in any drawing frame blend with cotton, less waste means a cost saving.

EASE OF DYEING. Avron dyes to any shade easily without changing your techniques. In fact, it has a greater affinity for dye than cotton.

LIGHTER FABRICS FOR SAME STRENGTH. Because of the strength of AVRON fibers you can turn out lighter wash 'n' wear fabrics of the same strength as cotton, and a more even fabric because of the uniformity of AVRON yarn. Also, standard weight cotton constructions can be made with 75 to 100% greater tensile strength and tear strength.

PROPERTIES OF AVRON FIBER OF SPECIAL IMPORTANCE TO THE MILL . . .



Stress Strain	100% Cotton	100% AVRON
Single Fiber Tensile (grams per denier)		
Conditioned	3.65	4.07
Wet	4.20	2.96
Single Fiber Extensibility		
Conditioned	10.0	30.2
Wet	13.0	37.0
Moisture Regain, Adsorption	7%	12%

COMPARISON OF YARN PROPERTIES

	Cotton*	AVRON
Yarn Count (Cotton System)	30/1	30/1
Turns/Inch	24.0	16.5
Lea Skein—Strength (lbs.)	72	100
Product	2170	3000
Single End—Strength (ozs.)		
Conditioned	10.2	13.9
Wet	11.8	9.7
Single End—Product		
Conditioned	307	418
Wet	354	290
Single End—Extensibility		
Conditioned	6.1	20.0
Wet	9.3	24.0

1-1/32" to 1-1/16" Carded Cotton

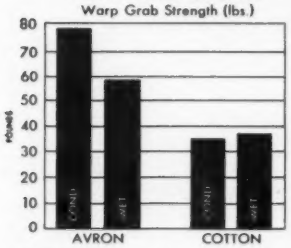
(Finer count yarns can obviously be made from AVRON fibers)

approach to wash 'n' wear fabrics warp and **AVRON*** rayon filling
high strength

COMPARISON OF AVRON AND COTTON IN FINISHED FABRICS

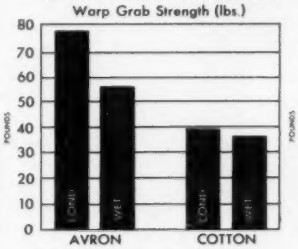
The following charts clearly demonstrate the superiority of AVRON over cotton.
Fabrics were tested before and after 20 home-type launderings at 140° F.

RESIN FINISHED–ORIGINAL
Warp Grab Strength (lbs.)



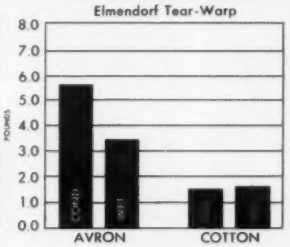
AVRON is about 123% stronger conditioned, about 60% stronger wet than cotton fabrics.

RESIN FINISHED–20 LAUNDERINGS
Warp Grab Strength (lbs.)



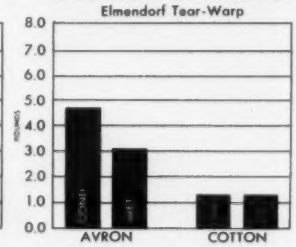
AVRON is 97% stronger conditioned, about 53% stronger wet than cotton fabrics.

RESIN FINISHED–ORIGINAL
Elmendorf Tear-Warp



AVRON is 273% more resistant to tear conditioned, 106% stronger wet than cotton.

RESIN FINISHED–20 LAUNDERINGS
Elmendorf Tear-Warp



AVRON is 262% stronger conditioned, 138% stronger wet.

HOW COMMERCIALLY-PRODUCED AVRON FABRICS COMPARE WITH MINIMUM REQUIREMENTS FOR WASH 'N' WEAR FABRICS, STATED BY NATIONAL ASSOCIATION OF SHIRT, PAJAMA, AND SPORT SHIRT MANUFACTURERS

	136 X 60 COMBED BROADCLOTH			100 X 58 CARDED BROADCLOTH		
	Required	Cotton Warp AVRON* filling	% Improvement	Required	Cotton Warp AVRON* filling	% Improvement
Filling tensile strength	25 lbs.	44 lbs.	76%	25 lbs.	40 lbs.	60%
Filling tear strength	450 gm	1600 gm	256%	450 gm	1600 gm	256%
Wrinkle recovery	220	250	14%	220	250	14%
Wash-wear rating	3.0-5.0	3.0-5.0	—	3.0-5.0	3.0-5.0	—

*Trademark American Viscose Corporation

For additional information about AVRON fibers and fabrics write directly to
AMERICAN VISCOSE CORPORATION, 350 FIFTH AVENUE, NEW YORK 1, N. Y.

AVISCO®

Rayon • Acetate • Cellophane

SUPPLIER NOTES

Reeves Brothers, Inc., New York, has developed a new adhesive for effectively bonding oriented nylon strip to neoprene. Called Reevestrip Adhesive, the product can be used with the same equipment that is employed for bonding neoprene to other materials.

George W. Pierce, formerly executive director and general manager of American & Efird Mills' finishing division, recently joined **Riggs & Lombard, Inc.,** and its affiliated companies, as southern sales engineer. In his new capacity Mr. Pierce serves the cotton and synthetic dyeing and finishing plants in the South. The Riggs & Lombard Charlotte, N. C., office is his headquarters.

Mr. Bunting

Mr. Welsh

Richard S. Bunting, formerly with Russell Manufacturing Co., has joined the dyestuff division sales force of **Sandoz, Inc.** The Hudson, Mass., office is his headquarters. * * * Robert Welsh has been transferred from the Philadelphia to the Pacific Northwest sales area for the dyestuff division of Sandoz.

Allis-Chalmers Manufacturing Co. has announced appointment of Hugh S. Sells as manager of the Boston district and Albert R. Knauss as Knoxville district manager.

H. Frank McKee has been named assistant product sales manager of the rayon textile sales department of **American Enka Corp.**

Air Reduction Chemical Co., a division of Air Reduction Co., Inc., is using the generic term "vinal" to identify the synthetic fibers of polyvinyl alcohol which Airco's fiber department is marketing. * * * Richard G. Mansfield, formerly with The Dow Chemical Co., has been appointed technical sales representative for the fiber department.

Charles A. Godsell has been appointed to the newly created post of eastern regional manager for **Shawinigan Resins Corp.** In this new capacity, Mr. Godsell is headquartered in the company's New York office and coordinates the activities of the New England, New York, and southern district sales offices.

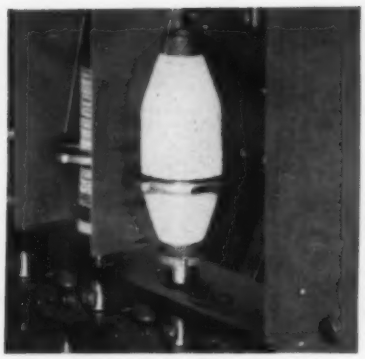
Joseph Brown and Allan Ralston have joined the sales staff of **Bradford Dyeing Association.** Mr. Brown formerly was service manager of Bradford's New York office. Mr. Ralston returned to Bradford after having left the firm in 1954 to go in business for himself.

Scott and Williams, Inc., has announced plans to establish a plant in Bruges, Belgium, to be known as Scott & Williams, S. A. The wholly owned subsidiary will be headquarters for Scott & Williams knit-

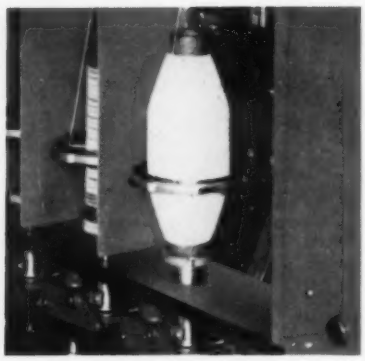
Continued on page 224

NON-FLUID OIL

TRADE MARK REGISTERED



Ordinary ring oils or greases spatter, blacken yarn



White NON-FLUID OIL stays on rings

The adhesive nature and high melting point of White NON-FLUID OIL keep it in wearing surfaces of twister rings and travelers. It does not spread out on rails to smear adjacent bobbins and blacken yarn.

White NON-FLUID OIL reduces the friction of travelers to a low point. As a result there are fewer broken ends and a greater output of more uniform quality yarn.

White NON-FLUID OIL is strictly neutral, does not become gummy, and lasts longer than liquid oil, petrolatum or ordinary ring greases. Result: less lubricant and fewer applications are required.

Send for free testing sample of White NON-FLUID OIL and Bulletin T-16. See for yourself.

NEW YORK & NEW JERSEY LUBRICANT CO.

292 Madison Ave., New York 17, N. Y.

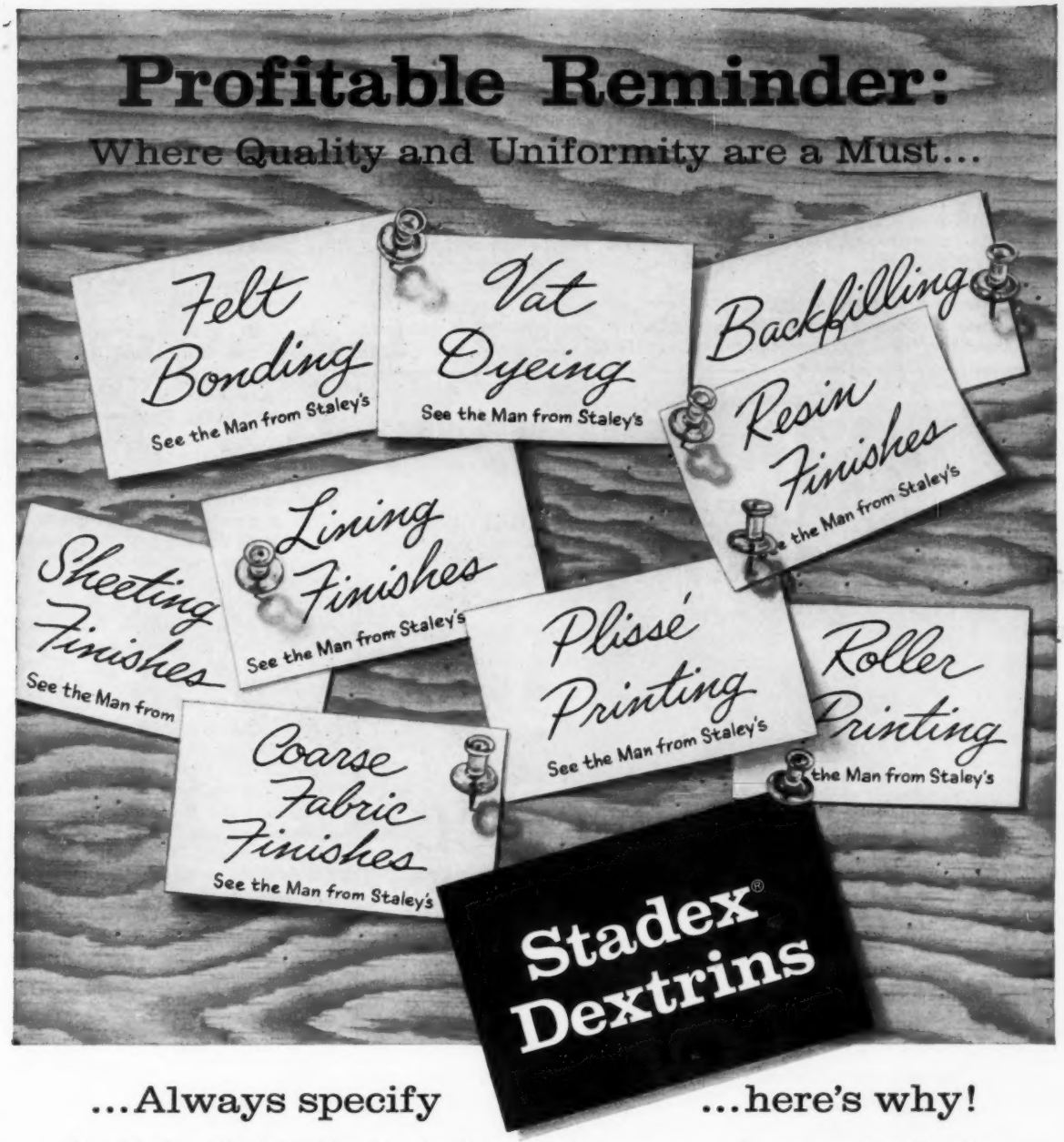
WORKS: Newark, N. J.

Sou. Dist. Mgr.: Fred W. Phillips, Greenville, S. C.

WAREHOUSES:

Atlanta, Ga. · Birmingham, Ala. · Charlotte, N. C. · Columbus, Ga. · Greensboro, N. C. · Greenville, S. C. · Providence, R. I. · Springfield, Mass. · Chicago, Ill. · Detroit, Mich. · St. Louis, Mo.

NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture. So-called grease imitations of NON-FLUID OIL often prove dangerous and costly to use.



...Always specify ...here's why!

In critical applications, like the nine listed above, variables must be reduced to the minimum if you are to consistently get uniform quality results. And there's no better way to insure uniformity throughout your operations than with Stadex Dextrins.

How is this possible? Staley's has developed an exclusive new process for manufacturing dextrins. And because of this new process, Stadex Dextrins possess a *degree of uniformity not found in other dextrins.*

In printing, finishing, bonding, dyeing—whatever your application . . . whether your requirements call for white or canary dextrins or British gums, remember this: Stadex Dextrins assure you of unsurpassed uniformity, highest quality and minimum color in a complete line *tailor-made* to meet your exact specifications.

For all the details on how Stadex Dextrins can improve your own specific process, see your Staley Textile Representative at the branch office nearest you or write today to:

Staley's®

A. E. STALEY MFG. CO., DECATUR, ILL.

Branch Offices: Atlanta • Boston • Chicago • Cleveland • Kansas City
New York • Philadelphia • San Francisco • St. Louis

SUPPLIER NOTES

(from page 222)

ting machine sales, service, and spare parts for the European Common Market.

Brook Motor Corp. has opened a branch office at 509 Fifth Ave., New York 17, N. Y. The New York area warehouse will continue to be at Jersey City, N. J.

Celanese Fibers Co., a division of **Celanese Corp. of America,** has appointed four new vice-presidents as follows: Dr. Bruce B. Allen, technical director; Peter H. Conze, director of marketing; Fletcher Horn, assistant to the president; and David Taylor, manager of manufacturing.

Clarke Floor Machine Co. has announced the elevation of Fred G. Cooper, vice-president, to the post of executive vice-president and secretary, and Harold Croskey, formerly secretary and sales manager, to the position of vice-president in charge of sales. James M. Apple has been appointed vice-president in charge of manufacturing.

Mr. Moody
Putnam Chem.

Mr. Ballard
Saco-Lowell

Leon E. Moody, formerly plant manager of Burlington Industries' Dublin Va., dyeing and finishing plant, has been elected executive vice-president of **Putnam Chemical Corp.**

Appointment of L. Hugh Ballard as sales engineer in the Charlotte district office of **Saco-Lowell Shops** has been announced. For the past three years, Mr. Ballard was associated with Werner Textile Consultants. * * * The Industrial Plant of J. P. Stevens & Co., Inc., Rock Hill, S. C., has recently purchased from Saco-Lowell ten Model FS-2, 13-½" x 7", 96-spindle, roving frames.

The transfer of Alfred Greenfield, product manager for Zefran acrylic fiber, from New York to textile fibers department headquarters at Williamsburg, Va., has been announced by **The Dow Chemical Co.** Simultaneously, the appointment of James Jones to the position of product manager for Rovana, Dow's new saran micro-tape, was made public. Mr. Jones formerly served as field sales manager for Zefran and as special assistant to the department manager at Williamsburg. Now the three product managers of Dow's fiber marketing effort are located at Williamsburg. Heber Allen is product manager for Lurex metallic yarns. * * * Organizational changes designed for more effective handling of its expanding interests in coatings for the textile industry have been announced. L. H. Silvernail has been promoted to group manager in the company's coatings technical service, in charge of four industry sections, including the textile section, which is concerned with Dow plastic products going into the textile industry. In active charge of the textile section is J. P. Strasser who was advanced from the post of customer service chemist in the textile field.

Fiber Finishes sales and service and the International Department of **Dow Corning Corp.** have established

Continued on page 228

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is the specialty of L. F. Dommerich. Since 1840, our comprehensive financial service has helped firms attain greater profits without financial headaches. Whether your business is in the $300,000 or the $30,000,000 class, a Dommerich plan, tailored to your needs and your goals, can help it thrive and grow.

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from BALTIMORE

The BALTIMORE STEAM PACKET COMPANY
(Old Bay Line)
is FIRST in the field of STEAMBOATING... being the oldest active steamboat line in the United States... began operations in 1840.

Courtesy – The Baltimore News-Post

– also from Baltimore...

YOUR First CHOICE IN BLACKS

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- ACID
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- ACETATE
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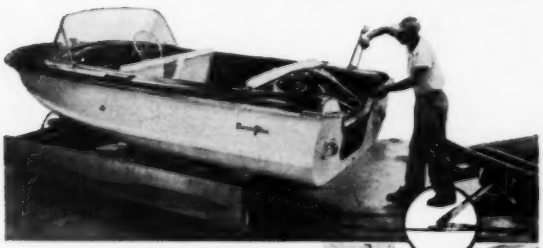
THE HOUSE OF BLACKS

Consult your local dyestuff distributors for information and samples. Shipments can be made from our Baltimore factory.

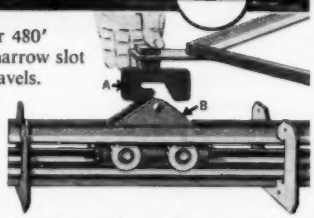
YOUNG ANILINE WORKS, INC.

OFFICE AND FACTORY: 2701-2733 BOSTON STREET • BALTIMORE 24, MARYLAND

AMERICAN "Chainless" in-the-floor conveyor tows bulky 1000 lb. loads!



Metal floor plates cover 480' conveyor, except for a narrow slot in which the tow bar travels. Personnel or vehicles can cross the assembly line without stopping production. Write for Catalog CD-B.

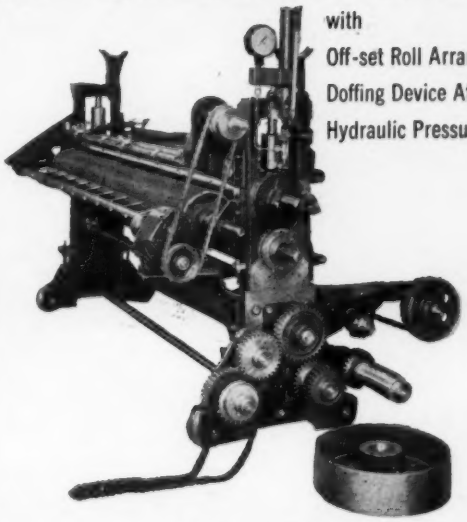


TOW BAR "A" is manually engaged and disengagad in trolley clevis "B". Eight-wheeled trolleys ride inside a 4-rail track. Steel rods with ball-socket joints connect trolleys.

CONVEYOR DIVISION
THE AMERICAN MONORAIL CO.
Fourth & Franklin Streets • Tipp City 24, Ohio

NEW "LIGHTWEIGHT" PERALTA® MACHINE

with
Off-set Roll Arrangement
Doffing Device Attachment
Hydraulic Pressure



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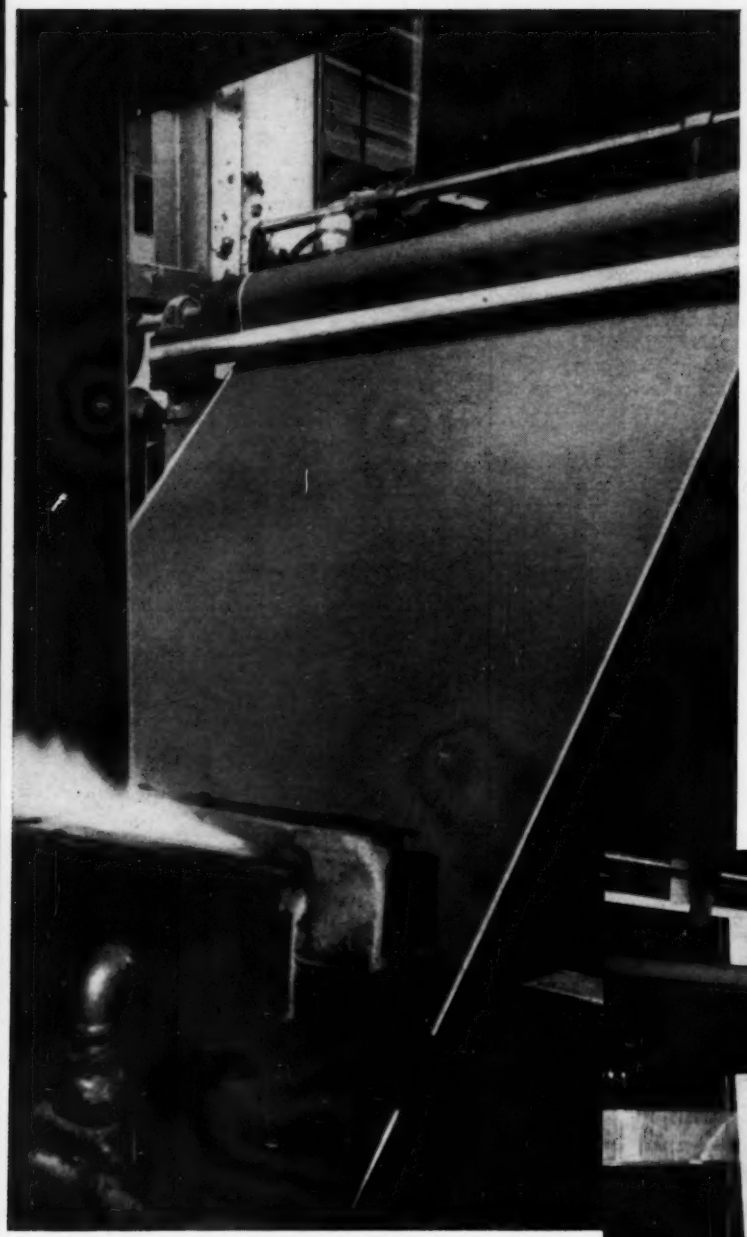
Main Street Jefferson, Mass. P.O. Box 25

GAS *equipment*
can help you
increase production speed
improve quality
reduce maintenance costs

Modern gas equipment can help you solve your heat problems.

Only gas gives the precisely controlled, economical heat at high enough temperatures needed in the curing or setting of modern fabrics and finishes. The volume of heat, the temperature, and the method of application varies widely, but recent advances made in the design of gas equipment insures the flexibility demanded for economical operation, increased production, and improved quality.

Furthermore, gas provides a large volume of heat in a small area, increasing production



Eliminate multiple passes – singe in one pass any fabric presently known with modern gas-fired equipment. Even high quality corduroy can get an exceptionally uniform singe in a single pass.

Gas-fired radiant burners can speed up your drying and setting of coatings or adhesives. Also eliminates sticking of adhesive to the first drying cans; reduces maintenance costs substantially.

speed with a small investment. Eliminate the purchasing of longer frames and expensive housings with the use of all new modern gas equipment or auxiliary burners.

For all textile heating applications – for singeing, Tenter Frame Drying, loop drying, nylon setting, calendering, can drying and setting of coatings – check with your gas company specialist on textile operations. He'll show you the economies and results you can get with modern gas equipment especially designed for the textile industry. *American Gas Association.*

Polymer PRODUCTS

YARN PREPARATION
Nylon Size (Polyacrilic Acid TS-20)†
Dacron Size (Polyfilm SD)
Loom Finish Size (Polyfilm L)
Fugitive Tints (Rinse Free Colors)
Softeners, Waxes, Lubricants, Plasticizers, Gelatines, Penetrants, Soluble Crayons

PRINTING-ROLLER and SCREEN
GUMS and THICKENERS
Water Soluble (Polygum 220, 221, 225, 230, 260)
Prepared Type (Polyprint SM 500)
EMULSION BASE THICKENERS FOR ALL DYESTUFFS

FINISHING
SOFTENERS
Cations (Polysoftener 200, 250, 800)
Anions (Polysoftener 75, 346 1525, 1610)
Nin-ionic (Polysoftener 100)
Sewing Lubricant A554

PLASTICIZERS
Polyflex 120, 910
Polylube P (Polyethylene Emulsion, Anionic)
Polylube EE (Polyethylene Emulsion, Non-ionic)

RESINS
Water Soluble (Polybond 20, 60, 90, BF)
Thermo Plastic (Polyvin Series)
Thermo Setting: Polyresin FS (Cyclic Urea Formaldehyde); Polyresin A850

WEIGHTERS
Polyweighter P
Polyweighter 6U

PIGMENT COLORS*
Imprint: Resinated Concentrates for Water System Printing
Impad: Concentrates for Pad Dyeing
Imperse: Non-ionic and Anionic Aqueous Dispersions

PIGMENT BINDERS
Binder Concentrate 1717
Low Crock Binder (1559, 1718)

ADHESIVES
Screen Table Adhesive W70
Screen Machine Adhesive SP

PENETRANTS, DETERGENTS, DEFOAMERS, THICKENERS, WETTING, AND REWETTING AGENTS, SYNTHETIC DYING ASSISTANTS

†Sole agents to textile industry for B. F. Goodrich Chemical Co., mfrs.

*Sole agents to textile industry for Imperial Paper & Color Co., mfrs.

Polymer

POLYMER INDUSTRIES
Springdale, Conn.
POLYMER SOUTHERN
Greenville, South Carolina

SUPPLIER NOTES

(from page 224)

their respective offices in the new Corning building at 717 Fifth Ave., New York 22, N. Y.

Lawrence Katz, president and chairman of the board of **Fidelity Machine Co., Inc.,** is now also in charge of sales operations for the entire Fidelity line of automatic precision machines for the knitting industries. Roy D. Faigenbaum, former vice-president in charge of sales, is no longer associated with the firm.

Recent appointments announced by **The Foxboro Co.** are as follows: R. F. Sutton has been named branch manager at Philadelphia; T. A. Jones, branch manager of the Atlanta, Ga., office; F. H. Leathers, regional engineer for southeastern states; G. W. Howlett, sales engineer at Pensacola, Fla.; and L. L. Hodges, sales engineer at Mobile, Ala.

Robert E. Brouillard has been named sales manager of pigments and H. Alison Webb has been appointed sales manager of dyestuffs for the dyestuff and chemical division of **General Aniline & Film Corp.** • • • Atlanta Solvents & Chemical Co., 2323 Lanasol Rd., Doraville, Ga., has been named distributor for Antara Chemicals, a sales division of General Aniline & Film Corp. Nonionic surfactants, sequestering agents, and ethylene and diethylene glycols will be handled.

United States Rubber Co. has appointed Fred R. Piermattei as commodity sales manager of the newly formed Royalene yarn department. Sales headquarters of the new department is at Providence, R. I., where Royalene polyethylene and polypropylene fibers are manufactured as monofilaments, multifilaments, and special shape extrusions.

Whitin Machine Works has announced the receipt of an order from American Thread Co., for 140 Piedmont spinning frames totaling 43,680 spindles. Sixty frames are scheduled for the plant in Tallapoosa, Ga.; the balance are for the Dalton, Ga., plant.

Stowe-Woodward, Inc., has announced the appointment of Leo C.

The ROTARY UNION Outlasts all other Rotating Joints

The Rotary Union's patented construction, with its optically flat mechanical seal, automatically adjusts to pressure ranges . . . eliminates mechanical maintenance and adjustments. Gives smooth sealing and unmatched service on all types of rotating heating or cooling equipment. Ball bearings reduce wear and power consumption.

A Precision Mechanical Seal
- **Self-Aligning**
- **Self-Adjusting**
- **Pipe Sizes ¼" thru 3"**

"WHERE *Good Connections* COUNT"®

*Trade Name Patented

PERFECTING SERVICE COMPANY, 332 Atando Ave., Charlotte, N.C.
Baltimore—Buffalo—Camden, N. J.—Chicago—Cleveland—Los Angeles
New York—Providence—Hamilton, Ont.—Montreal—Toronto

WARP DRAWING MACHINES HELP YOU KEEP AHEAD WITH FAST PATTERN CHANGES

Mills which are running fancy patterns, special weaves, short-order exclusives, or novelties are often bogged down waiting on drawing-in of new warps. The use of Barber-Colman Warp Drawing Machines can greatly relieve such situations because of the ease and rapidity with which new patterns can be drawn. Operating at speeds (depending on conditions) of from 2,000 to 5,000 ends per hour, these machines will draw cotton, worsted, wool, or filament and spun synthetics for plain or dobby weaves from a flat sheet, split sheet, double beam, or one-and-one leased warp. Correct selection of drop wire, heddle, and reed dent for each end is accurately controlled by a metal pattern strip punched in accordance with the designer's draft. Machines are made in several sizes with capacities up to 26 harness frames and 8 banks of drop wires. *For details, see your Barber-Colman representative . . .*

AMERICAN
TEXTILE MACHINERY
EXHIBITION
ATLANTIC CITY
NEW JERSEY
MAY 23-27, 1960

JUST WHAT YOU NEED FOR A FAST DRAW!

AUTOMATIC SPOOLERS • SUPER-SPEED WARPERS • WARP TYING MACHINES • WARP DRAWING MACHINES

BARBER-COLMAN COMPANY

ROCKFORD • ILLINOIS • U. S. A.

FRAMINGHAM, MASS., U. S. A. GREENVILLE, S. C., U.S.A. MANCHESTER, ENGLAND MUNICH, GERMANY

INDIA	MEXICO	BRAZIL	JAPAN	PAKISTAN	PAKISTAN
Batliboi & Company Forbes Street, Fort Bombay, India	J. Rabasa Isabel la Catolica 45-913 Apartado 7348 Mexico D.F., Mexico	Industria e Comercio de Maquinas S. A. "COMASA" R. Glicerio, 537/547 Sao Paulo, Brazil	Do Yei Shoji Kabushiki Kaisha Atlas Building (7th Floor) 11, Bingo-Machi, 3-Chome, Higashi-Ku Osaka, Japan	Associated Agencies (M'cr.) Ltd. Piccadilly House 11 Piccadilly Manchester 1 England	Associated Agencies (M'cr.) Ltd. 730, Muhammadi House, McLeod Road Karachi 2, Pakistan

SUPPLIER NOTES

(from page 228)

Laflamme as controller. He will be responsible for the accounting and financial activities of the firm's rubber roll, molded rubber products, and bowling ball divisions.

Celulosa y Derivados, S. A. (Cydsa), Monterrey, Mexico, and Algemene Kunstzijde Unie, N. V. (A.K.U.), Arnhem, Holland, have announced plans to erect a factory at Monterrey for the production of nylon 6 and nylon 66 textile yarns. Orders have already been given for equipment.

Hodag Chemical Corp. has completed construction of its enlarged production, laboratory, and office facilities. The new facilities include stainless steel blending tanks and a sonic homogenizer for the manufacture of silicone antifoams and other silicone products.

Robert F. Moody, formerly sales manager of the industrial truck division of **Hyster Co.,** has been appointed general sales manager with headquarters in Portland, Ore.

Mr. Herard
David Gessner

Mr. Kelly
Goodyear

Mr. Thies
Goodyear

Mr. Weldon
Goodyear

Richard A. Herard has been appointed southern representative for **David Gessner Co.** and is in charge of the Greensboro, N. C., office. Paul F. Riedl continues as service representative with headquarters in the Greensboro office.

Two new sales departments have been established within the chemical division of the **Goodyear Tire & Rubber Company.** The new departments, Polyester Products and Adhesives, bring the division's total sales units to five. L. P. Thies, former head of the division's Detroit office has been appointed manager of the Polyester Products department and will be responsible for sales and technical sales service of polyester resin, Vitel, to the fiber and textile industries. W. E. Kelly was named to head up the new adhesives department. * * * Joseph E. Weldon has been appointed sales representative in the Boston area and will be concerned primarily with the chemical division's sales of latices and resins to the textile and paint industries.

Pittsburgh Plate Glass Co. has appointed Guy J. Berghoff as vice-president in charge of the paint division. Since 1954 Mr. Berghoff has served as general manager of paint sales for the merchandising division.

The Richmond Oil, Soap & Chemical Co. has announced the appoint-

Continued on page 232

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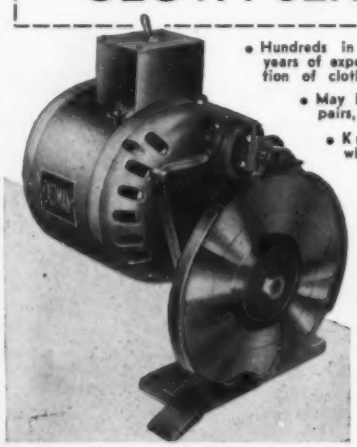

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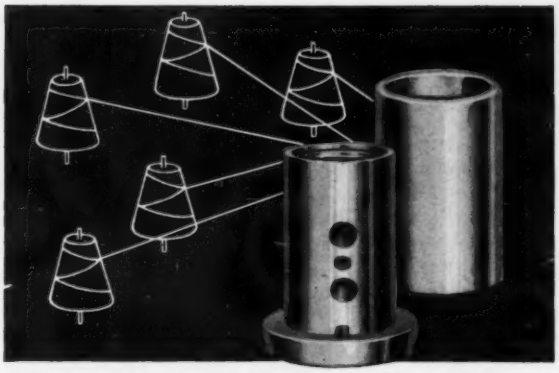

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SUPPLIER NOTES

(from page 230)

ment of Fawcett & Co., Ltd., 34 High Park Blvd., Toronto 3, Canada, as its sales and service organization in Canada.

The Canadian subsidiary of National Starch & Chemical Corp., **National Starch & Chemical Co. (Canada) Ltd.** recently announced the start of production at its newly completed vinyl emulsion polymerization plant in Toronto. Initially the plant will produce vinyl copolymers and homopolymers in emulsion form for sale to the textile and other industries.

E. Jack Lawrence, formerly of Howard Bros. Mfg. Co., has been appointed Ga.-Ala. representative of **Sykes, Inc.,** with headquarters in Atlanta, Ga. * * * Harry Moss, formerly associated with Clover Mills, Inc., Douglasville, Ga., has been put in charge of woolen and worsted sales. He will work out of Boston, Mass., and cover the entire U. S. * * * Sykes is opening a repair shop on Rutherford Road, Northwood Industrial Park, Greenville, S. C. Bryan Whitmire, S. C.-Tenn. representative, will be in charge.

Monsanto Chemical Co. has announced that **Texize Chemicals, Inc.,** Greenville, S. C., has been licensed to manufacture and distribute Sterox 21-K, a product used for the fulling and scouring of wool and wool blends. Texize also will distribute Monanto's complete line of surfactants for the textile industry.

American Conditioning House, Inc., has organized a new division known as Fiber Service to provide fiber identification, testing, and research on man-made and specialty fibers, as well as wool.

Miles Chemical Co. has announced that a new dialdehyde starch called "Sumstar" is currently being evaluated for a variety of industrial applications with particular emphasis on the role it might play in textile finishing. Investigations are said to have revealed that the product should provide resistance to both shrinkage and creasing by serving as a cotton cellulose cross-linker. It may also improve abrasion resistance and tensile strength. Use of the product as a combination sizing agent and cross-linker, eliminating the need for scouring, should be investigated, the company stated.

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Write for ..... Bulletin 713

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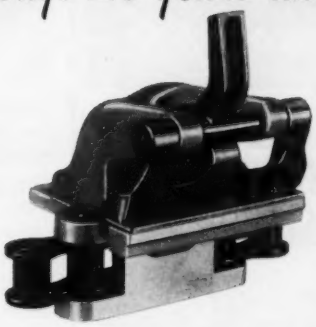

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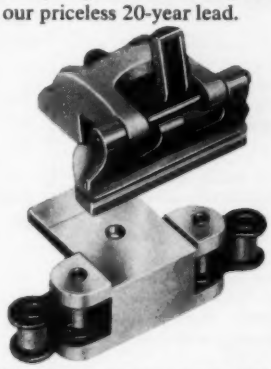

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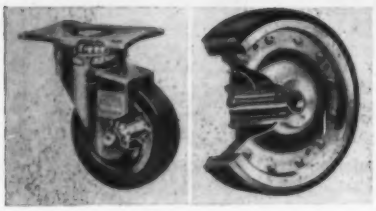

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Roving tester

(from page 171)

ings as obtained from a roving breaking strength tester (8) is seen in *Figure 2*. These rovings were processed from a Deltapine 1-1/16" cotton and sufficient twist added so that the average position of pointer E would be at the center of Chart H.

It is shown that both of the curves are parabolic and, as would be expected, the force necessary to effect a roving draft of 1.065 on the Belger is less than that necessary to break the roving on the strength tester. It is observed from this figure that as the roving becomes finer the force necessary for a draft of 1.065 approaches the force necessary to break the roving.

Precautions to Observe in Using the Belger. Although the Belger tester has been used at this laboratory for a number of years with very good success, it seems worthwhile to mention a few precautions regarding its use. One is that it definitely cannot be used as a measure of weight per unit length uniformity, or cross sectional uniformity.

The uniformity of the line traced by the pin on the Belger chart was found to be a function of twist. The more twist added to the roving the more uniform would be the line on the chart. This was observed with two 0.50 hank (1181 tex) rovings. One was from a mill and had high twist while the other was processed at the laboratory with low twist.

When tested on the Belger, the roving from the mill yielded a very uniform Belger chart and the roving from the laboratory yielded a variable chart. However, when tested on the Saco-Lowell sliver tester the per cent C.V. of the mill roving was 10.87 and that of the laboratory roving 8.23. This was a significant difference in uniformity.

Another precaution is that even though in the great majority of cases the Belger using a draft of 1.065 gives a good indication of the drafting qualities of rovings from different cottons, in some isolated cases it did not. Such an instance

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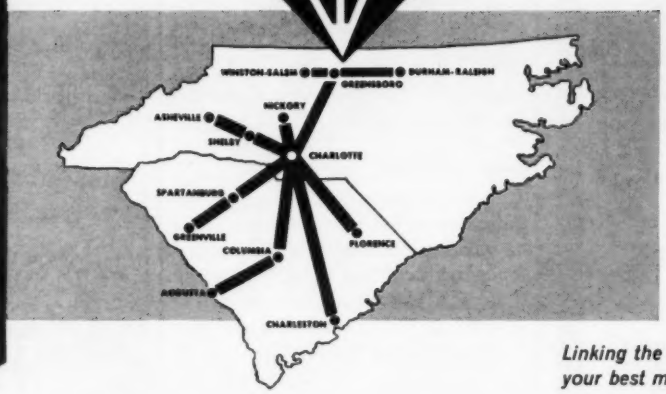

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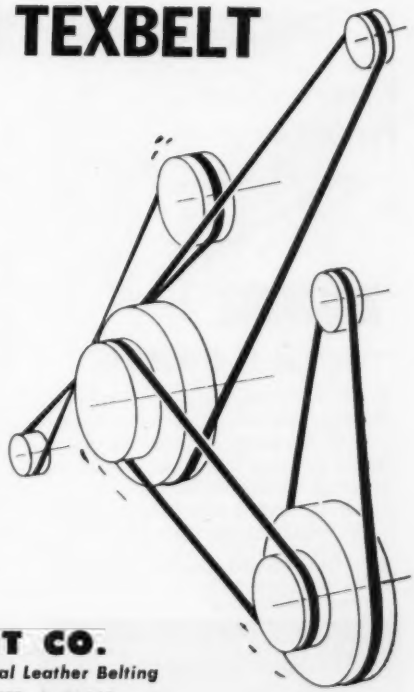

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was demonstrated at this laboratory when it was found that a 4.5 hank (131 tex) roving from an unknown variety cotton gave hard ends in spinning while the same hank from another unknown variety did not.

The same results were found to be true for a 2.0 hank (295 tex) roving from a Wilds and that from a Deltapine cotton. The Belger tester indicated that the equivalent rovings had the same strength. When these rovings were tested for breaking strength on the roving strength tester (8), there was a significant difference between the breaking strengths of the rovings which caused hard ends at spinning and those that did not.

This indicates that it would be better to know the breaking force of various hank rovings necessary for good drafting qualities rather than the force required to effect a draft of only 1.065. This is evidently due to the fact that breaking the roving is more comparable to actual practice where the spinning draft is high enough to completely take out the roving twist.

Table 2 lists the hank roving, turns per inch, fiber properties breaking force, and drafting force of the four rovings. It is observed from this table that the rovings that gave hard ends in spinning had significantly higher breaking strengths, although the drafting force was the same as indicated by the Belger tester.

Conclusions. The ability to find the force exerted by the Belger for different hank rovings and scale positions should prove very helpful in processing research. It should enable a better understanding of the effects of fiber properties, chemical treatments, etc., upon the draftability of roving.

While there are indications that it would be even better to know the breaking force of various hank rovings necessary for good drafting qualities, rather than the force required to effect a draft of only 1.065, instruments which have the breaking force correlated with good drafting qualities are not available.

It appears that the ideal roving tester would be one provided with

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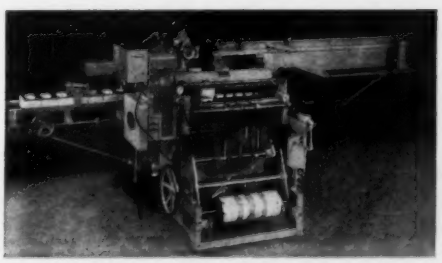

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TABLE 2. Hank Roving, Turns Per Inch, Fiber Properties, Breaking Force, and Drafting Force of Four Lots of Cotton.

	Cotton Variety			
	Unknown	Unknown	Deltapine	Wilds
Hard Ends in Spinning	no	yes	no	yes
Roving				
Hank	4.50	4.50	2.00	2.00
Tex	131.2	131.2	295.3	295.3
Turns Per Inch	2.21	2.45	1.58	1.25
Micronaire Reading[1]	4.30	3.60	4.45	3.90
U. H. M. Length[2]	1.08	1.02	1.21	1.30
Classer's Staple Length	1⅛	1 1/32	1 1/16	1 5/16
Breaking Force[3] (grams)	62.35	77.25	104	131
Drafting Force[4] (grams)	22.00	22.00	39.50	39.50

[1]Curvilinear scale.
[2]Fibrograph.
[3]Roving strength tester.
[4]Belger roving tester.

a draft high enough to completely eliminate the roving twist while continuously measuring the force required to draft it. Until such an instrument is developed and correlated, the Belger roving tester serves a very useful purpose for determining the roving twist required for good drafting for the majority of our American cottons.

Acknowledgment

The author wishes to express his appreciation to Dr. Hugh M. Brown, consultant for SURDD, and John Tailant, member of the Cotton Mechanical Laboratory, for their advice and aid in the preparation of this manuscript.

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4. Corley, J. R., Simpson, J., Fiori, L. A.,

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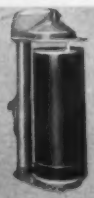

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and Brown, J. J., *Textile Research J.* 23, 750-754 (1953).
5. Duerst, J., COTTON (now TEXTILE INDUSTRIES) 103, 56-58 (Jan. 1939).
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7. Lawton, T. W., *Textile World* 85, 2045 (1935).
8. Simpson, J., Landstreet, C. B., Schnable, G., and Hutchens, H., *Textile Quality Control Papers* 3, 75-78, (1956).

Textile management

(from page 109)

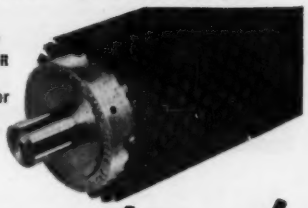
requirements described above, their scope and availability are inadequate to fill and keep supplied the pipelines for qualified managers.

TO HELP OVERCOME this shortage, industry-wide action should be taken on a broad scale. Existing textile associations could easily provide the frame within which to organize such action. What is advocated here is the creation of regional and national meetings of groups of young executives active in various phases of textile management for the purpose of holding workshop sessions at regular intervals to exchange ideas and experiences gathered in the day-to-day operations of mills and markets. Only through live interchange of practical know-how and techniques can we hope to stimulate and cross-fertilize the thoughts and actions of those whose services are today more needed than ever before.

Such advanced training alone will, however, not remedy the critical shortage of competent people in this crucial area of our industry. To swell their numbers we must do a better job in spreading the word about the accomplishments, challenges, and opportunities in the realm of textile management among all the audiences whose concepts and attitudes affect our fortunes in many subtle, yet potent ways.

We must be as much concerned with our customers' understanding of textile management, as with that of our suppliers, government agencies, bankers, and other opinion forming groups, because without their understanding we cannot hope to attract the people who will become tomorrow's leaders of our industry.

"a brush



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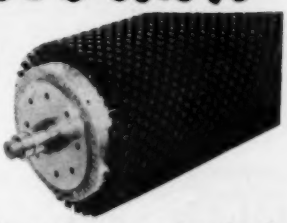

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ADVERTISER'S INDEX

A

Acme Steel Co. 70
Adams Co., Inc., R. P. 232
Adell Chemical Co. 230
Akron Spool & Mfg. Co. ..... *
Aldrich Machine Works 55
Allen Beam Co. 231
Allen-Bradley Co. ..... *
Allen Sons' Co. Div., Wm. 197
Allied Chemical Corp., ... 37, 38, 39, 40, 41, 42, 43, 44
General Chem. Div.
National Aniline Div.,
Semet Solvay Petrochemicals Div.
Solvay Process Div.
Allis Co., Louis 57
American Air Filter Co. 87
American Enka Corp. 2
American Gas Association 226, 227
American Moistening Co. 7
American MonoRail Co., Inc. 166
Conveyor Division 225
American Steel & Wire ..... *
American Viscose Corp. 220, 221
Anheuser-Busch, Incorporated 208-A
Antara Chemicals, General Aniline & Film Corp. 93
Applied Engineering Co. ..... *
Armstrong Cork Co. 110, 111
Arnold, Hoffman & Co. ..... *
Atkinson, Haserick & Co. ..... *
Atlanta Belting Co. ..... *
Atmospheric Control Ltd. 240

B

Bahnson Co. 17
Barber-Colman Co. (Textile Div.) 229
Barco Manufacturing Co. ..... *
Batson Co., Louis P. ..... *
Battle Creek Packaging Machines 237
Becco Chemical Division 51
Bendix Aviation Corp. 199
Benjamin Booth Co. ..... *
Bijur Lubricating Corp. 26
Birch Bros., Inc. ..... *
Borne Chemical Co. 168
Buffalo Forge Co 52
Buffalo Pumps, Inc. 94A
Butterworth & Sons Co. H. W. 45

C

Carbic Hoechst Corp. 33
Carter Traveler Co., Div. A. B. Carter, Inc. ..... *
Celanese Corp. of America & Subsidiary Cos. ..... *
Central Motors Lines, Inc. 235
Chandler Mach. Co. 230
Chemstrand Corporation (Acrilan) 82
Ciba Company ..... Front Cover
Classified Ads 240
Clements Mfg. Co. 231
Cleveland Tramrail Division, The Cleveland Crane & Engr. Co. ..... *
Clinton Corn Processing Co. ..... *
Clipper Belt Lacer Co. 50
Cocker Mach. & Fdry. Co. 112
Colgate-Palmolive Co. ..... *
Collins Brothers Mach. Co. ..... *
Columbia-Geneva Steel ..... *
Corn Products Sales Co. 94
Cotton-McCauley & Co., Inc. ..... *
Courtaulds (Ala.), Inc. ..... *
Crown Chemical Corp. 104
Curlator Corp. (Textile Div.) 27
Curtis & Marble Machine Co. 102

D

Darnell Corp., Ltd. 234
Dary Ring Traveler Co. ..... *
Davis & Furber Mach. Co. 56
Dayton Rubber Co. ..... *
Delmhorst Instrument Co. 206
Denman Textile Rubber Prods. Div. ..... *
Deublin Company 219
Diamond Crystal Salt Co. 28, 29
Diehl Mfg. Co. ..... Second Cover
Dixie Bearings, Inc. ..... *
Dodge Mfg. Corp. 208
Dommerich & Co., L. F. 224
Dow Chemical Company 60, 61
Textile Fibers Dept. ..... *
Lurex Division ..... *
Draper Corporation 1, 85
Dronsfield Bros. Ltd. 237
Duesberg-Bosson of America 225
Du Pont de Nemours & Co., Inc., E. I. (Electrochemicals Dept.) ..... *
Du Pont de Nemours & Co. Inc., E. I. (Finishes Div.) ..... *
Du Pont de Nemours & Co., Inc., E. I. (Textile Fibers Div.) ..... *

E

Eastern Engineering Co. ..... *
Eastman Machine Co. 230
Eriez Mfg. Co. ..... *
Esso Standard Oil Co. 46
Exact Weight Scale Co. 8
Extremultus, Inc. 23

F

Fafnir Bearing Co. 59
Fairbanks, Morse & Co. ..... *
Fairtex Corporation ..... *
Ferguson Gear Co. 204
Fiber Controls Corp. ..... *
Fife Mfg. Co. ..... *
Fisher Mfg. Co. ..... *
Foster Machine Co. 48
Foxboro Company ..... *
Franklin Process Co. 178, 179

G

G P E Controls, Inc. ..... *
Gardner Denver Co. ..... *
Garland Manufacturing Co. ..... *
Gaston County Dyeing Machine Co. 170
Gates Rubber Co. 20
General Dyestuff Corp. ..... *
General Radio Co. 217
Gessner Co., David 192
Goodrich Chemical Co., B. F. ..... *
Goodyear Tire & Rubber Co., Inc. Chemical Prod. 5, 213
Graton & Knight Co. 235
Gray Company, Inc. ..... *
Guider Specialty Co. 232
Gulf Oil Corp. 89

H

Harshaw Chemical Co. 13
Hartford-Greenville Div., Standard Screw Co. 22
Hayssen Mfg. Co., Inc. ..... *
Heller & Co., Walter E. 106
Herbert Products, Inc. ..... *
Hercules Powder Company 47, 208B
Herr Mfg. Co. 62
Hotel Gramercy Park 239
Houghton & Co., E. F. 54
Howard Bros. Mfg. Co. 234
Hubinger Co. ..... *
Hunter, Inc., James ..... *
Hunter Machine Co., James ..... *

I

Ideal Industries, Inc. 34
Industrial Heat Engineering Co. ..... *
Interchemical Corp. 24, 25
International Salt Co. 100
Interstate Textile Equip. Co., Inc. ..... *

J

Jacobs Northern Div., E. H. 202
Jenkins Metals Shops, Inc. ..... *
Jenkins' Sons, Inc., M. W. 239
Johnson Bronze Co. 231
Johnson Corp. 31

K

Kaiser Aluminum & Chemical Sales, Inc. 191
Keever Starch Company 184
Kemp Mfg. Co., C. M. ..... *
Kennett Materials Handling Division National Kidde Textile Mchy. Corp. 90, 91
Klauder Weldon Giles Machine Co. ..... *
Koppers Company, Inc. Chemicals & Dyestuffs Div. 95

L

Laurel Soap Mfg. Co. ..... *
Lestershire Spool Division National Vulcanized Fibre Co. ..... *
Lestoil, Inc. 230
Lincoln Engineering Company ..... *
Link-Belt Co. 71
Livingston & Haven Inc. ..... *
Lockwood Greene Engineers, Inc. 219
Loper Co., Ralph E. 238
Lovejoy Flexible Coupling Co. 16
Ludell Mfg. Co. 196

M

M-B Products Co. 236
Maguire & Co., Inc., John P. ..... *
Marlin-Rockwell Corp. 72
Marshall & Williams Corp. 233
McDonough Power Equipment, Inc. 238
Meadows Mfg. Co. ..... *
Metlon Corp. ..... *
Merrow Machine Co. ..... *
Mill Devices Co., Div. A. B. Carter, Inc. ..... *
Miller Corporation, Harry 11
Milton Machine Works, Inc. ..... *
Minneapolis-Honeywell Regulator Co., Industrial Div. 68
Minnesota Paints, Inc. 83
Moisture Register Co. ..... *
Monsanto Chemical Co. 215
Monsanto Chemical Co., Inorganic Chemical Div. 18, 19
Monticello Bobbin Co. 6
Moretex Chemical Co. ..... *
Morton Machine Works 238
Morton Salt Co. ..... *

N

National Ring Traveler Co. 12
National Starch Prod., Inc. 88
National Tube ..... *
National Vulcanized Fiber Co. ..... *
Nemo Industries, Inc. 206
New York & New Jersey Lubricant Co. 222
Nopco Chemical Co. 108

O

Oakite Products, Inc. 233

P

Pabst Brewing Co. 237
Parks-Cramer Co. 194, 195
Patterson-Kelley Co., Inc. ..... *
Penick & Ford, Ltd., Inc. 76
Pennsalt Chemicals Corp. 69
Perfecting Service Company 228
Perkins & Sons, Inc., B. F. 92
Pneumafil Corp. ..... *
Polymer Industries, Inc. 228
Powell Valves 74, 75
Pozzi S.p.A. Costruzioni Meccaniche Leopoldo ..... *
Proctor Chemical Co. 200
Proctor & Schwartz, Inc. 182

R

Radio Corp. of America Industrial Electronic Prod. ..... *
Red-Ray Manufacturing Co., Inc. ..... *
Reeves Division, Reliance Elec. & Engineering Corp. ..... *
Reiner, Inc., Robert 176
Reliance Elec. & Engr. Co. ..... *
Republic Steel Corp. ..... *
Reynolds Metal Co. ..... *
Rhoads & Sons, J. E. ..... *
Richards-Wilcox Mfg. Co. ..... *
Ridge Tool Company 203
Robbins & Myers, Inc. ..... *
Vulcanized Fiber Co. ..... *
Robert & Co., Associates, Inc. ..... *
Roberts Co. 9
Royce Chemical Co. ..... *

S

Saco-Lowell Shops 64, 65
Sandoz, Inc. 242
Sargent's Sons Corp., C. G. 58
Scheer Co., Inc., Geo. 206
Scholler Bros. Inc. 36
Scott & Williams, Inc. ..... *
Seydel-Woolley & Co. 73
Shell Chemical Corp. ..... *
Shell Oil Co. ..... *
Signode Steel Strapping Co. ..... *
Simco Company 16
Sims Company 86
Sims Metal Works ..... *
Sinclair Refining Co., Inc. 94-B
Sirrine & Co., J. E. 234
SKF Industries, Inc. 84
Sonoco Products Co. 53
Southern Airways Co. 98
Southern Machinery Co. 81
Southern Shuttles Div. 63
Southern States Equip. Corp. 14, 15
Southern Textile Works 240
Spraying Systems Co. ..... *
Square D Company 21
Staley Mfg. Co., A. E. 223
Standard Brands, Inc. ..... *
Standard Chemical Prod., Inc. 190
Standard Oil Co. (Kentucky) ..... *
Star Paper Tube, Inc. ..... *
Statikel, Inc. 240
Stauffer Chemical Co. 49
Steel Heddle Mfg. Co. 63
Stover Co., Charles G. 240
Stowe-Woodward, Inc. ..... *

T

Taylor Instrument Companies ..... *
Tennant Co., G. H. 10
Tennessee Coal & Iron ..... *
Tennessee Corp. 207
Tensitron, Inc. 240
Terrell Mach. Co., Inc. ..... Third Cover
Texaco, Inc. ..... *
Textile Industries ..... *
Textile Machine Works 174
Textile Paper Products, Inc. 205
Textile Shield Co., Inc. 236
Theiler Corp., H. J. 204
Toledo Scale Company 30
Ton-Tex Corp. ..... *
Trumeter Company ..... *
Trust Company of Georgia ..... *
Turbo Machine Co. ..... *
Tyer Rubber Company ..... *

U

Union Steel Products Co. 32
U. S. Steel Corporation, Stainless Steel Division ..... *
Universal Metal Hose 198
Universal Winding Co. 66, 67

V

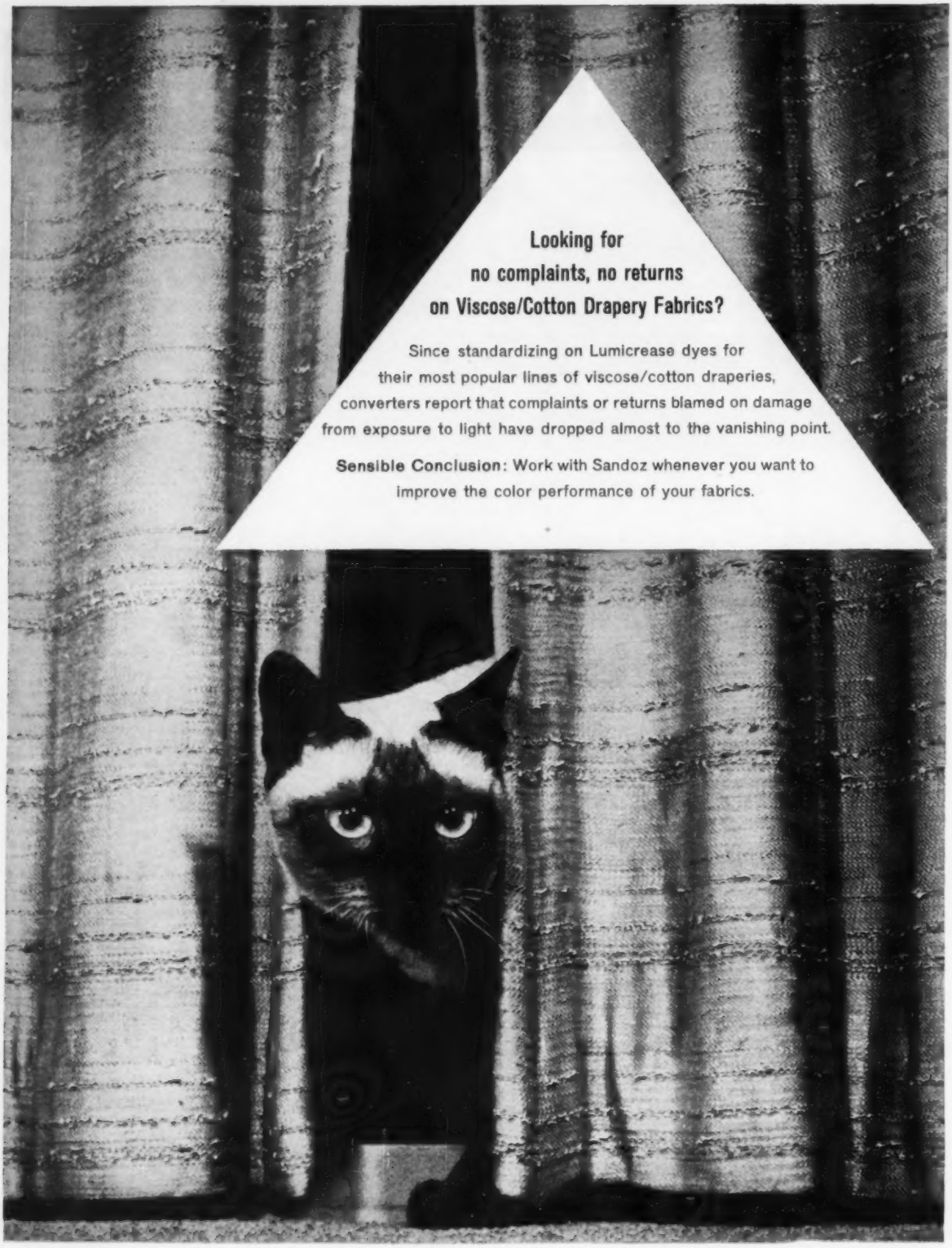
Veeder-Root, Inc., Fourth Cover

W

Want Ads 240
Ward Steel Company 238
Warner & Swasey Co. ..... *
Watson & Desmond 201
West Bend Equipment Corp. 236
West Point Fdy. & Mach. Co. ..... *
Westvaco Chlor-Alkali Division, Food Machinery & Chem. Co. 35
Whitehead Die Casting Co. 236
Whitin Machine Works 186
Whitinsville Spinning Ring Co. 198
Wildman-Jacquard Co. ..... *
Wiley & Sons Inc., John ..... *
Wonalancet Company 219

Y

Young Aniline Works, Inc. 225
Young Machine Co., F. A. 96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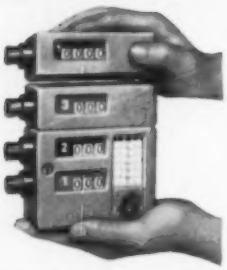

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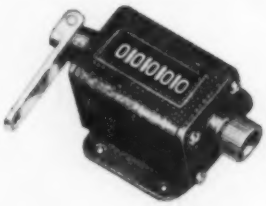

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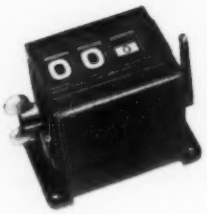

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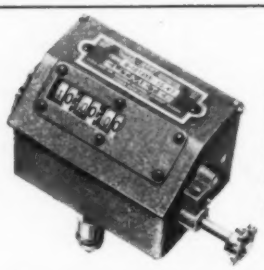

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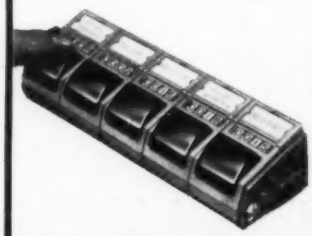

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